ACI News Letter

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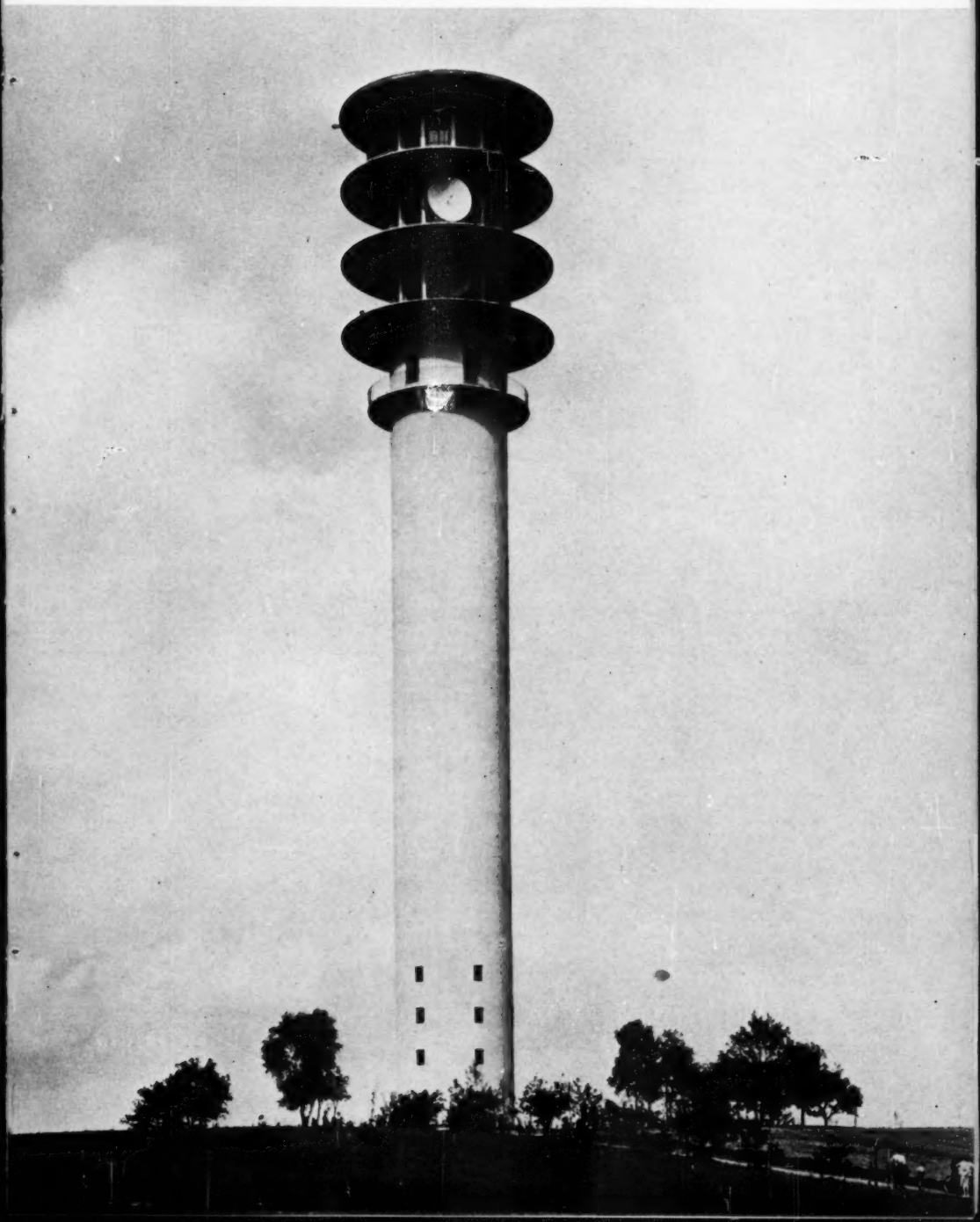

Deteriorated concrete and exposed reinforcing steel in piers of tailrace prior to Prepakt restoration.

Without dewatering or halting the generators, tailrace piers were converted to better-than-ever condition by Prepakt techniques.

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...DIDN'T STOP PREPAKT!

Seriously eroded concrete tailrace piers at the power plant of a leading Ontario pulp-and-paper company demanded prompt repair—but a power shutdown meant costly production delays.

The use of Prepakt methods and materials permitted this project to be completed quickly and economically *without shutting down the generators*.

The "non-stop" technique used on this job took advantage of Prepakt's proved, low-cost restoration procedure. First, cracked and crumbling materials were removed from the deteriorated piers. Then, forms were built and filled with coarse aggregate. Finally, pumping Intrusion mortar displaced the water and thoroughly consolidated the preplaced aggregate.

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News Letter Contents

June 1954

On the Cover—Microwave transmission tower of the Deutsche Bundespost, Wardboehmen, near Soltau, Germany, built in 1952. The 70 m high tower, with a shaft diameter of 8 m, was built with sliding forms. Contractors—Lenz-Bau AG / Grun & Bilfinger AG.

—*Courtesy Deutscher Beton-Verein E. V. (Wiesbaden)*

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ACI Technical Committee Activities — 1953-54

A high level of activity is continuing in the majority of ACI technical committees. In addition, the past year saw reactivation of one committee and organization of two new ones. Committee 317, Reinforced Concrete Design Handbook, was reactivated for the purpose of bringing up to date the ACI special publication *Reinforced Concrete Design Handbook*.

A need was recognized for the development of methods of structural design and for improvement and standardization of construction practices in the use of concrete masonry units. In consequence, Committee 331, Structures of Concrete Masonry Units, was organized.

It also became apparent that a field existed for organized effort toward improving and standardizing concrete practices in residential construction. The result was formation of Committee 332, Recommended Practice for Residential Concrete Work.

More tangible benefits of committee activities have been the reports and papers published in the JOURNAL. Committee 711's revised standard, "Minimum Standard Requirements for Precast Concrete Floor Units (ACI 711-53)," was published in the Sept. 1953 JOURNAL. The work of Committee 315 culminated in publication of the *Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures (ACI 315A-53)*.

One new standard (Jan. 1953 JOURNAL) and revision of another (Oct. 1953 JOURNAL) were proposed by committees and ratified with some amendments by the membership this month. Committee 505's "Standard Specification for the Design and Construction of Reinforced Concrete Chimneys" will appear in the September JOURNAL. Committee 613's "Recommended Practice for Selecting Proportions for Concrete" will also appear in the September JOURNAL. This standard supersedes the 1944 standard by the same committee. Committee 716's work also resulted in publication of several reports on high-pressure steam curing.

The future is just as bright. Several committees will offer material for publication in the near future: Committee 212's report on admixtures, a report on model analysis of a skewed rigid frame bridge and slab based on the work of Committee 314, a bibliography on prestressed concrete by Committee 323, and a new revised *Manual of Concrete Inspection* by Committee 611. Many other committees are at work on projects which are expected to culminate in published reports in the JOURNAL or special publications.

ACI Technical Committees

Technical Activities Committee
Organized 1947

The Technical Activities Committee is responsible, under the Board of Direction, for technical publications, convention programs, and technical committee activities (see p. 20, *1953 ACI Directory*). Terms of members expire at the annual convention of the year indicated. The President of the Institute is a member during and by reason of his tenure of office; similarly the Secretary-Treasurer of the Institute is secretary of the committee. The chairman, president, and secretary constitute the committee's executive group.

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Standards Committee
Organized 1937

The Standards Committee supervises the promulgation of standards according to rules adopted by the Board of Direction (see p. 20, *1953 ACI Directory*).

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Committee 115—Research
Organized 1921

This committee was organized to affiliate the interests of research workers and agencies in the field of concrete. Its assignment is to review and correlate research in concrete and reinforced concrete and to consider research methods and objectives. A compilation of research projects is prepared and distributed each year at the open session of the committee at the annual convention. During the past year 76 organizations from all parts of the United States and several foreign countries, including universities, state and federal highway departments, cement companies, industrial and commercial laboratories and associations, reported 525 different projects underway, covering research in the fields of aggregates, admixtures, cements, and plain and reinforced concrete.

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Committee 207—Properties of Mass Concrete
Organized 1930

Committee 207 is responsible for reporting developments in mass concrete construction. Two task groups appointed in 1951, one to prepare a report on properties of mass concrete and the other to give consideration to the mass of data compiled by the committee regarding the long-time behavior of mass concrete structures in service, are expected to report to the committee in the near future.

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Office, Chief of Engineers, Dept. of the Army
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Hydro-Electric Power Comm. of Ontario

Committee 208—Bond Stress
Organized 1930

This committee is assigned to the promotion of research and to the collection and interpretation of data from field and laboratory to determine proper working stresses for bond in relation to type of bar employed in reinforced concrete construction. With regard to design matters the role of Committee 208 is purely advisory.

Recently-published researches refocus attention upon the long-known disruptive wedging inherent in the use of any lug-type deformed bar, whether it be old style or current ASTM A-305. Questions are raised regarding the validity, for specification purposes, of bond results secured from tests on specimens that were reinforced against splitting. With renewed controversial interest in some of the basic problems of bond in relation to long-time and/or currently accepted practices, it appears that Committee 208 (as a sort of intermediary between the areas of research and design) is almost certain to be confronted with proposals demanding careful objective study. The task immediately ahead, therefore, is a continuation of current activity: to scrutinize the data and to inaugurate new recommendations or propose modifications to existing ones if and as the need becomes apparent.

HERBERT J. GILKEY, Chairman
Iowa State College

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Laclede Steel Co.

Committee 209—Volume Changes and Plastic Flow in Concrete
Organized 1930

This committee was reorganized in 1946 to consolidate the previous assignments of Committee 102, Volume Changes in Concrete, and Committee 109, Plastic Flow. Since that time the advent of prestressed concrete has introduced problems which were not anticipated in 1946, and the committee was again reorganized in 1953.

The assignment of Committee 209 is to review critically the available data on the factors affecting the magnitude of volume changes and plastic flow of concrete; to suggest topics of needed research, and to stimulate the preparation of papers to interpret the available information in a form useful to the designers of concrete structures.

Some of the problems to be investigated include: (1) creep at high load; (2) effect of ingredients of concrete on creep; (3) effect of moisture content on creep; (4) effect of drying during the loaded period; (5) effect of air entrainment; (6) effect of sense and intensity of load; and (7) the mechanism of creep. New techniques have given new types of concrete, such as lightweight, steam-cured, and prepacked concrete, for which creep properties should be determined.

The committee plans to give further attention to the problems of the designer of prestressed concrete, and feels that all available creep data should be reduced to the point where it can be used easily by concrete designers.

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Battelle Memorial Institute

Committee 210—Resistance to Erosion in Hydraulic Structures
Organized 1940

The committee is collecting information which will enable it to publish a report of benefit to designers and specification writers concerned with hydraulic structures. A new draft is in preparation with a view to publication in the near future.

WALTER H. PRICE, Chairman
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Committee 212—Admixtures
Organized 1943

This committee studies, assembles, and reports information on the effect of various admixtures, including air-entraining agents, on the properties of concrete. Admixtures are defined by the committee as "a substance other than portland cement, aggregate, or water that is used as an ingredient for concrete."

During the past year Committee 212 has been engaged in preparing a report on "Admixtures for Concrete," which was previewed at ACI's 50th annual convention in Denver last February. The committee had previously reported in 1944 (ACI JOURNAL, Nov. 1944, *Proc.* V. 41, pp. 73-88). In this new report, admixtures are treated in 11 different classifications, the advantages, limitations, and pertinent uses of each class being rather fully discussed. Final editing of the report is in progress, aimed at making it available for early publication.

WILLIS T. MORAN, Chairman
Bureau of Reclamation

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Committee 213—Properties of Lightweight Aggregates and Lightweight Aggregate Concrete

Organized 1946

This committee's assignment is to gather, correlate, and report available information on the properties of concrete made with mineral lightweight aggregates in the fields of monolithic structural concrete, precast concrete, and insulating and roof and floor fill concrete, with special reference to the following: unit weight, compressive strength, transverse strength, absorption, permeability, resistance to freezing and thawing action, resistance to high temperatures, volume changes due to moisture variations, elastic and plastic properties. The committee will confine its first report to considerations of available commercial aggregates. Preliminary work is under way.

A secondary mission of the committee is to report on design and construction practices in the field of lightweight concretes.

The committee is also planning a symposium on lightweight aggregates and lightweight concrete to be presented at the 1955 ACI convention in Milwaukee, Wis. Later the information will be published in a series of papers in the JOURNAL.

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Committee 214—Evaluation of Results of Compression Tests of Field Concrete

Organized 1946

The committee's assignment is to analyze the variations which occur in the strength of concrete, to present tools of statistics which are useful in interpretation of these variations, and to discuss measures of reliability which can be used in establishing specifications and design criteria for the strength of concrete. A preliminary draft of the committee's first report is now under study by committee members.

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CHARLES S. WHITNEY
Ammann and Whitney

Committee 215—Fatigue of Concrete

Organized 1947

The assignment of this committee is threefold: (1) to review the available data on the behavior of plain and reinforced concrete under repeated loading, and to prepare a report on the present state of knowledge in the field; (2) to consider the implications of this knowledge in the design of members and structures of plain and reinforced concrete; and (3) to determine the gaps in our knowledge, and to recommend and encourage research which will provide the information to fill these gaps. A preliminary draft of a bibliography on fatigue of concrete has been circulated in the United States and abroad to

persons it was felt would be interested and who might contribute additions or corrections.

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Oregon State Highway Dept.
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Bureau of Public Roads

Committee 312—Plain and Reinforced Concrete Arches
Organized 1930

This committee has published three reports in the ACI Journal on reinforced concrete arch design—correlating much that has been learned of the influence of dead and live loads, and volume changes due to shrinkage, plastic flow, and temperature change. The most recent report, May 1951 Journal, presented a general design method, and a final report will be submitted as soon as an adequate standard can be prepared on current research.

Charles S. Whitney, Chairman
Ammann and Whitney
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Ammann and Whitney
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Ohio State University

Committee 314—Rigid Frame Bridges
Organized 1935

This committee is charged with accumulating data on the behavior of rigid frame bridges, with reference to the effects of dead and live loads, impact, and other factors, on both model and prototype structures.

The work of Committee 314 during the last year dealt mainly with tests on model beams and cylinders, on an aluminum model of a skewed-slab rigid frame bridge, and on a $\frac{1}{8}$-scale model of a skewed slab geometrically similar to the $\frac{1}{2}$-scale model tested previously at the University of Illinois. A report on this research, "Model Analysis of a Skewed Rigid Frame Bridge and Slab," by D. H. Pletta and Dan Frederick, was presented at the 50th annual convention in Denver; it is tentatively planned for publication in an early issue of the Journal.

Future work will involve tests on a 1/10-scale reinforced concrete model of an existing skewed rigid frame bridge and the development of a mathematical analysis for such structures.

Dan H. Pletta, Chairman
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Virginia Polytechnic Institute

Committee 315—Detailing Reinforced Concrete Structures
Organized 1936

Highlight of last year's activities was publication of the *Manual of Standard Practice for Detailing Reinforced Concrete Highway Structures* (*ACI 315A-53*), a companion volume to the *Manual of Standard Practice for Detailing Reinforced Concrete Structures* (*ACI 315-51*). To date seventy-odd thousand copies of this latter manual have been distributed since its original appearance.

The new "Highway Manual" was prepared in cooperation with the Concrete Reinforcing Steel Institute and the Committee on Bridges and Structures of the American Assn. of State Highway Officials.

While not exactly within the assignment of Committee 315, the committee collaborated extensively in producing an International Correspondence Schools course in detailing concrete structures. This course is intended to train young men to become efficient detailers and it also serves as one part of a general curriculum in civil engineering and in architecture. A study is also under way to determine whether this course could be adapted for instruction on detailing in engineering colleges.

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Committee 317—Reinforced Concrete Design Handbook

Organized 1939

Committee 317 was reactivated in 1953 for the purpose of bringing up to date the ACI special publication *Reinforced Concrete Design Handbook* published in 1939. Distribution of this original handbook has been worldwide in scope and totals hundreds of thousands copies. The committee is now actively engaged in revising portions of the handbook to conform with latest codes and practice.

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Committee 318—Standard Building Code

Organized 1929

The committee's assignment is to periodically review and up-date the Institute's "Building Code Requirements for Reinforced Concrete." The most recent revision was the 1951 Code. It is currently continuing with the assignment of keeping the Code in line with current design and construction practice and correcting any provisions which do not prove satisfactory in actual use.

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Committee 321—Design of Reinforced Concrete Slabs—Joint ACI-ASCE
Organized 1941

This committee, joined as an ACI-ASCE endeavor in February, 1953, is assigned the problem of analysis and design of bridge and building slabs. The immediate objective will be the problem of floor slabs in buildings, including the effect of uniform and concentrated loadings. The committee is making a study of accurate solutions of the problem that have been developed in recent years, as well as of experimental data that have been made available; this with a view toward investigating the adequacy of current and proposed approximate methods of design. Data have been accumulated during the past year on the effect of stiffness of supporting beams on building slab construction. Summaries of these data are being prepared for study by the committee and for possible publication.

Plans are under way to run tests of different types of construction and design of flat and two-way slabs. Consideration is also being given to transmitting to the Reinforced Concrete Research Council material on multiple panels for concrete floors, with hopes that the council will be interested in supporting the program.

NATHAN M. NEWMARK, Chairman
University of Illinois
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American Iron and Steel Institute

Committee 323—Prestressed Reinforced Concrete—Joint ACI-ASCE
Organized 1942

This committee was assigned to review present knowledge of prestressed concrete, to develop design procedure, and to recommend needed research. Reorganized as a Joint ACI-ASCE group in 1952, there are now five subcommittees whose activities have resulted recently in a bibliography of about 2000 references (to be published by ACI later this year), study of patent development in U. S. and abroad, and publication of "Proposed Definitions and Notations for Prestressed Concrete," October, 1952, JOURNAL.

The committee has started preliminary work on a manual of recommended practice for prestressed concrete structures. At least 20 small task committees are working on the preparation of sections of the proposed manual. Membership of these task committees consists not only of the members of Committee 323, but also of a large group of consultants who have agreed to assist with the work.

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C. C. ZOLLMAN
Vacuum Concrete, Inc.

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†Corporation Member.

Committee 324—Precast Reinforced Concrete Structures
Organized 1946

The committee reports completion of its preliminary assignment of a comprehensive survey of available information dealing with the design and construction techniques of precast concrete structures. Utilizing the compiled data of the survey, the committee is now engaged in the preparation of a standard applicable to precast concrete construction. The proposed report, "Proposed Minimum Requirements for Thin-Shell Precast Concrete Construction," will cover precast concrete of thin sections as distinguished from the conventional precast concrete which is generally believed to have been covered by the ACI Building Code.

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C. D. Wailes Corp.

Committee 325—Structural Design of Concrete Pavements for Highways and Airports
Organized 1948

The committee's assignment is to develop a recommended practice for the design of structural details for concrete highway and airport pavement—slab dimensions, cross section, joints, reinforcement, etc.—on the basis of the best information available, and to keep such recommendations up to date as new information indicates need for revision. During the past year, the four subcommittees (on subgrades and bases, slab dimensions, structural design of joints, and steel reinforcement) were actively engaged in preparing drafts of their respective assignments.

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Highway Research Board

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Committee 326—Shear and Diagonal Tension —Joint ACI-ASCE
Organized 1950

A Joint Committee of ACI and ASCE was formed in 1950 with the assignment of developing methods for designing reinforced concrete members to resist shear and diagonal tension consistent with the new ultimate strength design methods. The committee is also listed as a subcommittee of ASCE's Masonry and Reinforced Concrete Committee.

An initial test program investigated shearing strength of a reinforced concrete slab under a centrally located concentrated load. A program of tests on the shear strength of concrete members without shear reinforcement, sponsored by the Reinforced Concrete Research Council, was recently completed at the University of Illinois and it is anticipated that the data will be reported in future issues of the Journal.

The Committee on Reinforced Concrete Research of the American Iron and Steel Institute is also sponsoring an investigation at Columbia University on the diagonal tension resistance of reinforced concrete beams which are subjected to multiple loads simulating a uniformly distributed load. Test specimens have been chosen so as to afford direct comparisons with tests made for the same committee at the National Bureau of Standards. In addition, an investigation of the diagonal tension resistance of two-span continuous beams is under consideration.

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Committee 327—Ultimate Load Design —Joint ACI-ASCE

Organized 1952

A Joint Committee was formed in 1952 with the Subcommittee on Ultimate Load Design of the ASCE Committee on Masonry and Reinforced Concrete, Structural Division. The assignment is to evaluate and correlate theories and data bearing on ultimate load design procedures with a view to establishing them as accepted practice. Several research projects have already been completed and others are in progress to secure information to fill the gaps in the knowledge of the performance of reinforced concrete members at or near ultimate loads in order to prepare a recommended design practice.

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Committee 331—Structures of Concrete Masonry Units

Organized 1953

The Board of Direction approved formation of Committee 331 in October, 1953, with the mission to develop methods of structural analysis and design, recommend design and construction practices, to provide users of concrete block, brick, and tile with authoritative information and guidance in plain and reinforced concrete masonry.

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Texas Industries, Inc.

Committee 332—Recommended Practice for Residential Concrete Work

Organized 1953

The Board of Direction approved formation of Committee 332 in October, 1953, with the mission to explore the feasibility of preparing a recommended practice in the field of residential concrete work.

The committee is already actively engaged in studying the early publication of guide details on recommended good practice on residential work, with concrete floor slabs on grade as the first project. Subsequent committee work will take up types of simplified concrete foundations.

Of special interest are some of the comments from the first meeting of the committee in conjunction with ACI's 50th annual convention in Denver last February. The importance of publication of ACI regulations for particular application to small dwelling construction was emphasized. It was pointed out that large scale home builders have necessary engineering service within their own organization and normally do not have a problem in efficient economical design. However, many home builders around the country do not have such engineering facilities and would find it of much value to have available authoritative guide material from ACI speci-

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fically on small structures. Considerable importance would be attached to such ACI recommendations by building code authorities and related groups.

The committee also is assembling and reviewing technical data developed from laboratory tests and field investigations carried out by industry, government, and research organizations.

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Committee 505—Design and Construction of Reinforced Concrete Chimneys

Organized 1922

Committee 505 was reactivated in 1948 for the purpose of studying the tentative standard 505-36T adopted in 1936. A revised proposed standard, "Proposed Standard Specification for the Design and Construction of Reinforced Concrete Chimneys," was published in the January 1953 JOURNAL but because of insufficient time for study by Members before the 1953 convention the committee requested that action on its adoption as a standard be postponed until the 1954 convention.

At the 50th annual convention in Denver, the committee offered as amendments certain revisions (*News Letter*, ACI JOURNAL, Mar. 1954, p. 7). These were accepted by convention vote and the report was recommended for adoption as an Institute standard. The proposed standard then went to ACI membership for secret letter ballot which was canvassed June 1. The Institute membership has now voted in favor of raising the report to standard status and the standard will appear in the September JOURNAL.

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Committee 604—Winter Concreting Methods

Organized 1929

This committee completed its original assignment when its report was published and adopted as ACI Standard "Recommended Practice for Winter Concreting Methods (ACI 604-48)." Under its new chairman, the committee is undertaking a review of the existing standard. It is believed the greatest need lies in detailing minimum practical requirements and methods for typical sizes and types of concrete work. Revisions will be made with this as a primary objective.

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Committee 609—Compaction of Concrete by Mechanical Means

Organized 1934

A change in committee title from "Vibration of Concrete" to the present title was approved in 1953. It was felt that a study of dry-tamped concrete was within the field of Committee 609's activities. Since zero slump concrete would probably need compacting by methods that could not accurately be termed vibration, it was deemed necessary to change the committee's title.

This committee has the assignment to revise and bring up to date a former report (ACI JOURNAL, Mar.-Apr. 1936, *Proc.* V. 32),

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and has been organized to encourage research to discover the basic effects within concrete, produced by vibrators of different design, and to determine how their characteristics can be used to the greatest advantage. The advent of air entrainment in concrete has made it necessary to give consideration to the removal of such air by vibration.

A symposium on vibration practice was presented by the committee at the 1953 convention.

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Committee 611—Inspection of Concrete

Organized 1935

The committee's 140-page *Manual of Concrete Inspection* was distributed to the membership July, 1941, and is available (for $1.00) from ACI headquarters. The committee has drafted a new edition and expects that it will be approved and published in 1954. Chief feature of the revision is a general re-examination and expansion of explanatory matter so as to be of greater use to the inspector.

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Committee 612—Recommended Practice for Curing Concrete

Organized 1936

This committee is developing a recommended practice for curing concrete with a view to early availability of the report. The committee is now sponsoring basic research at the National Bureau of Standards on curing methods. A symposium on curing was sponsored at the 1952 convention.

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Committee 613—Recommended Practice for Proportioning Concrete Mixes

Organized 1936

Highlight of the year's activities was publication of "Proposed Recommended Practice for Selecting Proportions for Concrete" (ACI JOURNAL, Oct. 1953, p. 105). The proposed standard will supersede ACI's 1944 standard, "Recommended Practice for the Design of Concrete Mixes (ACI 613-44)."

The proposed standard was adopted with minor amendments at the 50th annual convention and went to ACI membership for ratification by secret letter ballot, which was canvassed on June 1. The membership approved the new standard and it will appear in the September JOURNAL.

The committee is now planning to investigate the problems involved in preparing a recommended practice for proportioning lightweight concrete mixes and recommendations for proportioning mixes for no-slump concrete, with particular reference to the specialized mixes needed for the various methods for making concrete pipe and also those required for other concrete products.

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National Ready Mixed Concrete Assn.

Committee 616—Recommended Practice for the Application of Paint to Concrete Surfaces

Organized 1936

This committee's report, "Recommended Practice for the Application of Portland Cement Paint to Concrete Surfaces" was adopted as an ACI Standard at the 45th annual convention and ratified by the membership by letter ballot June 29, 1949. The adopted standard was published in the September 1949 JOURNAL.

The committee is now studying paints, other than cement paints, for use on concrete surfaces. Development of a recommended practice for use of organic base paints is expected by 1955.

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CLARA SENTEL*
National Bureau of Standards

Committee 617—Specifications and Recommended Practice for Concrete Pavements and Bases

Organized 1937

A revision of "Specifications for Concrete Pavements and Bases (ACI 617-44,)" was adopted at the 47th annual convention, Feb. 20, 1951, and ratified by the membership by letter ballot Apr. 5, 1951. The revised standard (ACI 617-51) was published in the May 1951 JOURNAL. The committee recognizes the need to keep the specifications current and plans are now in progress to consider the standard and make any recommendations for improvement.

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and National Sand and Gravel Assn.

Committee 711—Precast Floor Systems for Houses

Organized 1934

A revised standard for precast floor units, "Minimum Standard Requirements for Precast Concrete Floor Units," was adopted at the 1953 convention and ratified by letter ballot May, 1953, as ACI 711-53. The new standard was published in the September, 1953, JOURNAL.

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Committee 716—High-Pressure Steam Curing

Organized 1941

Reactivated in 1950 because of an awakening of interest in high-pressure steam curing, the new group began a study of the report

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of former Committee 716 (ACI JOURNAL, April 1944, *Proc.* V. 40, p. 409) considering possible additions to the old report including: (1) the requirement and method of testing pertaining to shrinkage and moisture movement of concrete products, (2) chemical reactions which occur during high pressure steam curing, and (3) preparation of adequate criteria for judging whether or not a product has received adequate curing for the intended use. Four laboratories have continued the project begun in 1951 of determining the physical properties of high-pressure steam-cured block. Committee work has resulted in reports published in the April and May, 1953, issues of the JOURNAL ("Physical Properties of High-Pressure Steam-Cured Concrete Block" and "Chemical Reactions in High-Pressure Steam Curing of Portland Cement Products" respectively).

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ASA Sectional Committee (A56) Building Code Requirements for Excavations and Foundations

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Reinforced Concrete Research Council

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Ammann and Whitney

Standing Committee for Simplified Practice Recommendation R163-48, Coarse Aggregates (Crushed Stone, Gravel and Slag). Commodity Standards Division, U. S. Dept. of Commerce

F. V. REAGEL
Missouri State Highway Dept.

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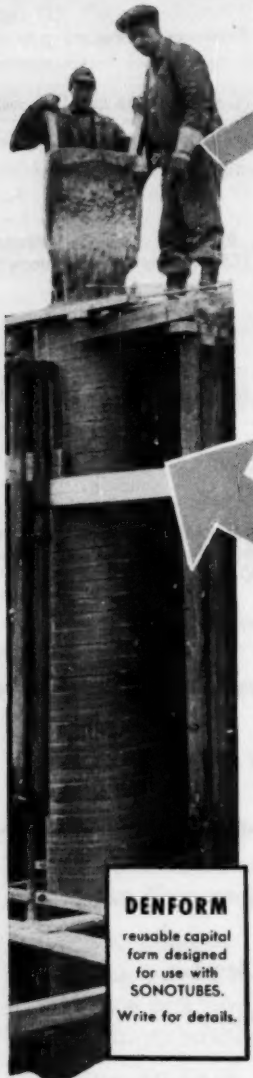

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Los Angeles Regional Meeting

Plans are taking form for the regional meeting of the American Concrete Institute to be held at the Statler Hotel, Los Angeles, Calif., Oct. 28-29, 1954. On each of these days technical papers will be presented in morning and afternoon sessions. Speakers and subject titles will be announced at a later date, but the nature of the program has been decided upon.

A session will be devoted to the properties and production of concrete. Papers will discuss field methods in testing concrete consistency by ball penetration, concrete strength by the impact hammer, and determination of cement content of concrete before hardening. Strength of concrete as affected by rattler test variations in aggregates and some of the fundamentals of alkali-aggregate will be other subjects of interest.

In another session, papers will be presented on selected development subjects, such as requirements of steel for prestressing, strength of continuous prestressed beams, plant for manufacture of precast products, and features of freeway design and construction.

For a third session, it is planned to schedule a group of papers dealing with earthquake effects on concrete structures, a method of analysis of reinforced concrete structures and of the effects produced by earthquake forces, together with other material in related fields of current interest.

A portion of the program planned for the final session is a forum in which a series of short subjects will be illustrated and discussed, describing several recent projects with design and construction features of special interest. Also to be presented at this session will be some specific developments in concrete techniques.

The entertainment committee, headed by C. D. Wailes, Jr., C. D. Wailes Corp., Los Angeles, has plans for making the visit enjoyable for all. A committee headed by Robert G. Swan, general contractor, Los Angeles, will provide means for inspecting interesting work on the Wednesday preceding or the Saturday following the two-day technical sessions.

Notices and reservation cards will go out to the members in the states of the region in August and full details of the program, as arranged by J. L. Peterson's committee, will be published in September, according to present plans.

The committee expects a large attendance from the local and regional areas, and extends a cordial invitation to those more distant to visit Los Angeles and participate in this meeting. Regardless of membership in the American Concrete Institute, everyone interested in concrete construction will be given a hearty welcome at this, the first meeting of the Institute to be held in this area.

LOOKING AHEAD

July 11-21, 1954—Sixth Pan American Road Congress, American Road Builders' Assn., Pan American Division, in cooperation with the Venezuelan government and Western Hemisphere engineers, Caracas, Venezuela

August 4-6, 1954—Conference on New Developments in Engineering Design, Virginia Polytechnic Institute, Blacksburg, Va.

October 18-22, 1954—42nd National Safety Congress and Exposition, National Safety Council, Conrad Hilton, Congress, Morrison, and LaSalle Hotels, Chicago, Ill.

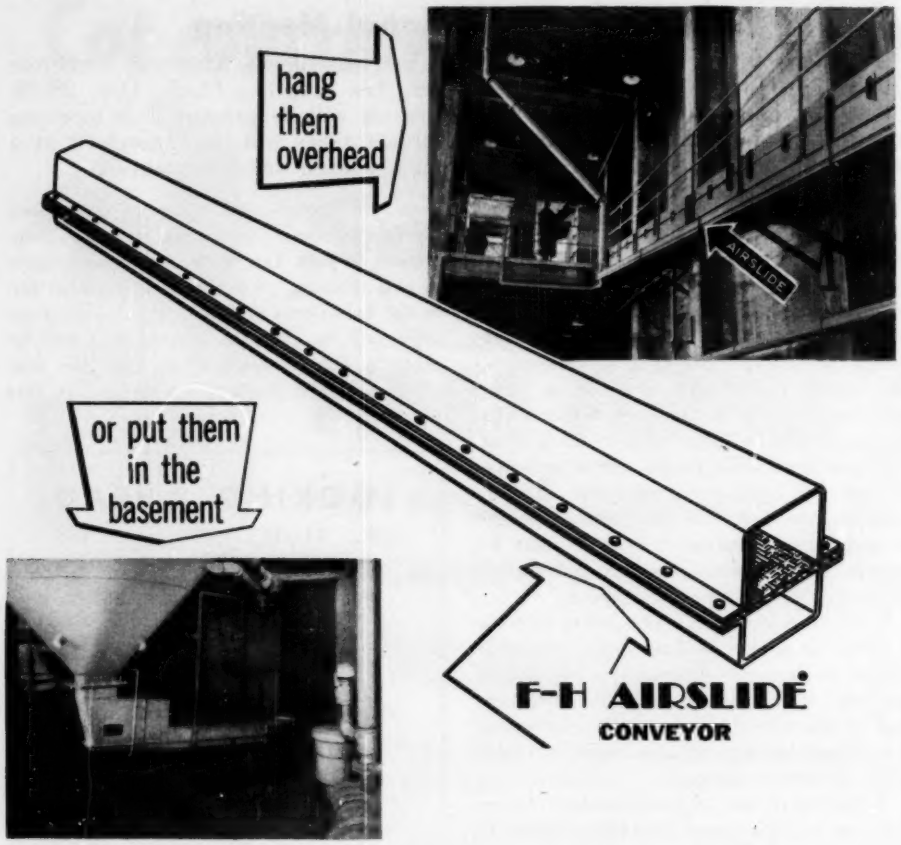
October 28-29, 1954—Los Angeles Regional Meeting, American Concrete Institute, Statler Hotel, Los Angeles, Calif.

November 15-17, 1954 — Fifth National Conference on Standards, American Standards Assn., Hotel Roosevelt, New York, N. Y.

November 19-30, 1954—Second International Congress of Civil Engineering, Caracas, Venezuela

September 21-23, 1954—Society for Experimental Stress Analysis and International Congress and Exposition, Bellvue-Stratford Hotel, Philadelphia, Pa.

February 21-24, 1955—51st Annual Convention, American Concrete Institute, Hotel Schroeder, Milwaukee, Wis.



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Positions and Projects — ACI Members

Bullen receives award

Joseph A. Bullen, Jr., operations manager, Fountain Sand and Gravel Co., Pueblo, Colo., recently was presented with the Pueblo Junior Chamber of Commerce's Distinguished Service Award presented annually to the "young man of the year" who is judged to have contributed most to the community, state, and nation. Mr. Bullen was cited for his efforts in civic affairs, welfare endeavors, and professional leadership, as well as for his occupational status.

Insley retires from NBS

Herbert Insley, internationally known for his research in the microstructure and chemistry of mineral products, recently retired as chief, Mineral Products Division, National Bureau of Standards. He is remaining in Washington, D. C., having opened offices as a consulting mineralogist.

Zaborowski appointed vice-president

Robert Zaborowski, manager of the architectural and engineering branch of the New York office of Roberts & Schaefer Co., Chicago, Ill., has been appointed vice-president of operation.

Vermiculite Institute elects officers

L. G. McDiarmaid, vice-president, Insulation Industries, Vancouver, B. C., was elected president of the Vermiculite Institute, Chicago, Ill., at its recent annual meeting in Coronado, Calif. W. J. Bein, vice-president, Zonolite Co., and E. R. Murphy, both of Chicago, were returned as treasurer and managing director, respectively. H. W. Steiff, vice-president, Western Mineral Products Co., Minneapolis, Minn., was named a member of the board of directors.

Mr. Bein gave the keynote address, summarizing the range and versatility of vermiculite products. R. W. Sterrett of Atlanta, Ga., chairman of the institute's concrete and roofing committee, described a new vermiculite concrete roof system that has a *U* value of 0.15, is economical to install, and is not damaged by exposure to weather before built-up roofing can be applied.

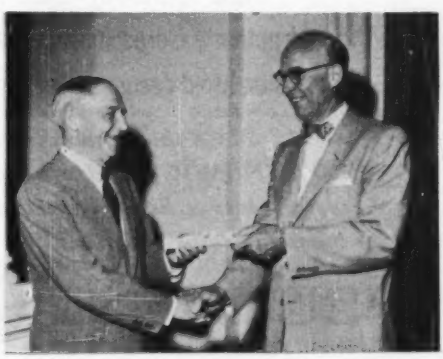
Clark receives CRSI 1954 award

The 1954 Award of the Concrete Reinforcing Steel Institute was given to Arthur P. Clark, Research Associate for the American Iron and Steel Institute at the National Bureau of Standards, Washington, D. C.

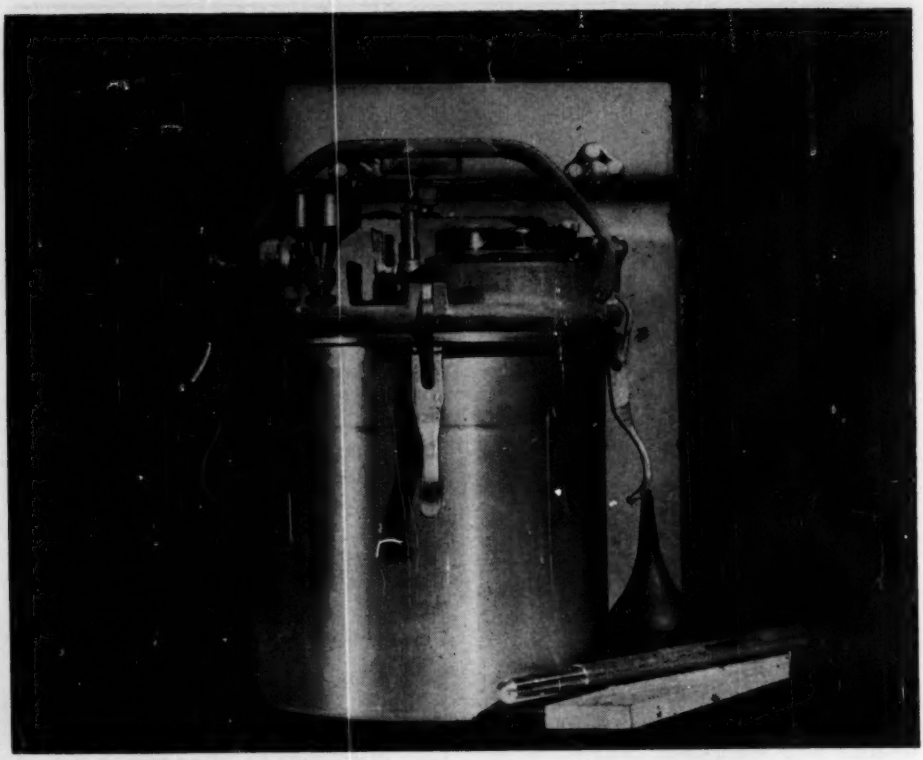
Mr. Clark received the award for his contribution to the development of the A-305 type of reinforcing bar—the bar now recognized as the American standard for use in present day reinforced concrete construction.

Mr. Clark is a graduate of the Michigan State Normal College and the University of Michigan. He is a member of ACI, ASCE, and has contributed a number of papers which have been printed in the ACI JOURNAL. He is presently a member of ACI's Board of Direction.

The CRSI award is administered by representatives appointed by the American Concrete Institute, Associated General Contractors of America, and American Society of Civil Engineers. The 1954 Award Committee consisted of: chairman—Earl J. Wheeler, president, Frank Messer & Sons, Inc., Cincinnati, Ohio (Associated General Contractors); H. J. Gilkey, head, Department of Theoretical and Applied Mechanics, Iowa State College, Ames, Iowa (American Society of Civil Engineers); and Vernon P. Jensen, Manager of Development, C. F. Braun & Co., Alhambra, Calif. (American Concrete Institute).



Arthur P. Clark (left) receiving the 1954 Concrete Reinforcing Steel Institute Award from Earl J. Wheeler, Award Committee Chairman, at CRSI's recent 30th annual meeting



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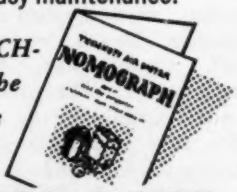

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Two new ACI standards adopted

On June 1, 1954, the secret letter ballots on adoption of two proposed standards as Institute standards were canvassed and the membership approved both as amended at the 50th annual convention. "Standard Specification for the Design and Construction of Reinforced Concrete Chimneys" (report of Committee 505, as amended) and "Recommended Practice for Selecting Proportions for Concrete" (report of Committee 613, as amended) will appear in the September JOURNAL. The latter standard supersedes "Recommended Practice for the Design of Concrete Mixes (ACI 613-44)."

McClure promoted

James C. McClure, formerly assistant vice-president, Universal Atlas Cement Co., New York, N. Y., was recently appointed vice-president and general sales manager of that organization. Mr. McClure, a native of Tipp City, Ohio, and a civil engineering graduate of Ohio State University, joined Universal Atlas in 1927, serving as technical service engineer in Ohio until 1935, when he was promoted to technical service manager at Pittsburgh. In 1938, he was appointed district sales manager at Albany, N. Y.; in 1946, sales manager at Dayton, Ohio; and in 1952, assistant vice-president at New York. He is a member of ACI and the Ohio Society of Professional Engineers.

BRI holds annual meeting

The spring meeting of the Building Research Institute was held recently in Hershey, Pa. Technical sessions covered the light-construction industry, future developments in air conditioning, large building design and construction, and a symposium on industrial acoustics. Included in the technical sessions was a discussion on construction research in large buildings by E. K. Abberley, vice-president, Turner Construction Co., New York, N. Y.

Pelsue elected vice-president

Garvin Pelsue has been elected vice-president in charge of plant operations of the Jaeger Machine Co., Columbus, Ohio. He was formerly manager of plant operations. Mr. Pelsue is a past president of the National Ready Mixed Concrete Assn.

Michigan Tech honors Steinman

At the commencement convocation at the Michigan College of Mining and Technology at Houghton, Mich., the honorary degree of Doctor of Engineering was recently conferred upon David B. Steinman, internationally eminent bridge engineer. Dr. Steinman was the commencement speaker; the subject of his address was "The Professional Man and His Ideals."

Causing joins Princeton staff

Humbert Causing, formerly civil engineer, Porter-Urquhart, Skidmore, Owings & Merrill, Casablanca, French Morocco, is now on the staff at Princeton University, Princeton, N. J.

Bahmeier heads engineering team

Herman F. Bahmeier, construction engineer for the Bureau of Reclamation, Sacramento, Calif., has gone to Australia as head of a six-man team of Bureau engineers, beginning two-year assignments to advise the Australian government on the Snowy Mountains hydroelectric project. A 40-yr veteran in the water engineering field, Mr. Bahmeier has been with the Bureau since 1930, and was last in charge of construction of the Folsom powerplant, Nimbus dam and powerplant, and the Sly Park dam. Among those accompanying Mr. Bahmeier are Elmo C. Higginson and Richard B. Ward.

Besser Co. celebrates 50th anniversary

Besser Manufacturing Co., Alpena, Mich., recently completed its 50th year of business by a celebration honoring that occasion. Over 700 guests inspected the 175,000 sq ft modern Besser plant, now employing over 800 people, where a small-barn like structure with 20 employees started making Besser concrete block machinery in 1904. In contrast with the original machines that produced 150 to 200 block a day, latest models can make over 10,000 block daily, and machines with 15,000 block per day capacity are in production.

Jesse H. Besser, son of the founder, Herman Besser, was presented with a 50th Anniversary Plaque by M. E. Rinker, president, National Concrete Masonry Assn., in recognition of Mr. Besser's activity in the industry.

News on
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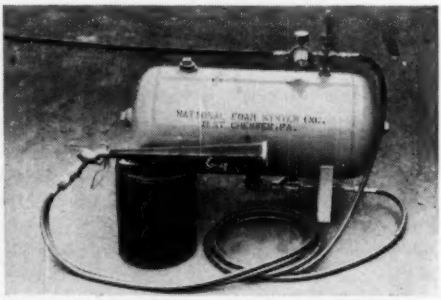

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Waterways Experiment Station rounds out 25 years of service

On June 18, the Waterways Experiment Station of the Army's Corps of Engineers rounded out a quarter-century of research and experimental work that has played a major part in the nation's river and harbor and flood control work.

Colonel Carroll H. Dunn, director, estimated that 10,000 visitors inspected the experiment station's two installations at Vicksburg and Jackson, Miss., during open house periods held in observance of the silver anniversary. Major General Samuel D. Sturgis, Chief of Engineers, and some of the leading scientists and engineers in the country were among those present.

The experiment station is the principal investigational facility of the Corps of Engineers in the fields of hydraulics, soils mechanics, and concrete.

The Concrete Division, headed by Herbert K. Cook, is located at the station's Jackson plant. Thomas B. Kennedy is in charge of the Concrete Branch of the laboratory and the Special Investigations Branch is under the direction of Bryant Mather. All three of these men are long-time members of the American Concrete Institute and each is a member of several ACI technical committees.

As the concrete research laboratory for the entire Corps of Engineers, this organization is responsible for developing means for reducing concrete construction costs while still maintaining concrete of equal or better quality than that which is now being produced. The laboratory's current work in the research field covers 11 major projects.

One of these projects is an exhaustive study covering the use of 16 carefully selected materials which may be used advantageously to replace a portion of the portland cement in structures of mass concrete. One phase of this program consisted of the proportioning and use of 169 separate concrete mixtures.

The current phase requires the casting of twenty-five 37-cu yd concrete blocks, all containing 6-in. aggregate. Cement factors will range from 1.75 to 4.00 bags of cement, or cement plus replacement, per cubic yard. Criteria will be set up eventually to evaluate specific cement replacement materials for use in concrete on specific projects.

The station's concrete specialists are assisting in preparation of a paper on cement substitutes that will be presented in Paris next year before the International Commission on Large Dams.

Concrete Research Division laboratory and office building

Another important function of the laboratory is the compilation, editing, and maintenance of the Corps' *Handbook for Concrete and Cement*. The handbook is revised quarterly and contains approximately 150 test methods and specifications for use by the entire Corps of Engineers.

Portland cement from oil shale

Feasibility of using oil shale both as a fuel and a ingredient in the manufacture of portland cement has been proved at a considerable savings in production costs, according to Fred Kloiber, consulting engineer, General Industries, Inc., Philadelphia, Pa. Mining of oil shale is said to be at a low unit cost because most deposits are near the surface of the earth.

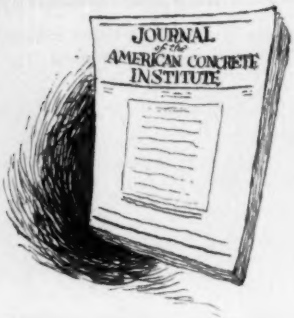
Principal advantages, claimed by Mr. Kloiber, for using oil shale for portland cement lie in fuel savings; less equipment needed for unloading, storing, grinding, and handling of fuel; and no large fuel supplies for emergencies.

All essential constituents of portland cement are present in oil-shale ashes, according to Mr. Kloiber, with excesses of SiO_2, Fe_2O_3, and Al_2O_3 but only a fraction of CaO required for cement. This necessitates adding a fairly pure limestone to bring up the CaO percentage.

Wecker elected director

Walter A. Wecker, president and director, Marquette Cement Mfg. Co., Chicago, Ill., has been elected a member of the board of directors of Poor and Co. Mr. Wecker has been associated with Marquette since 1914 and has been president and director since 1933. He is also a director of the Portland Cement Assn. and the Chicago Assn. of Commerce and Industry.

Have you wished afterwards that you had saved your Journal issue?



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According to the architect, Mr. John Hans Graham, a reinforced concrete frame was selected for this new low-cost apartment building for three reasons: ***Economy***—This flatplate type of construction proved less expensive than any other kind of structure. ***Speed of Erection***—A complete slab was poured on this project every week. ***Flexibility***—This construction allows complete freedom in locating intermediate partitions, pipes, ducts, etc.

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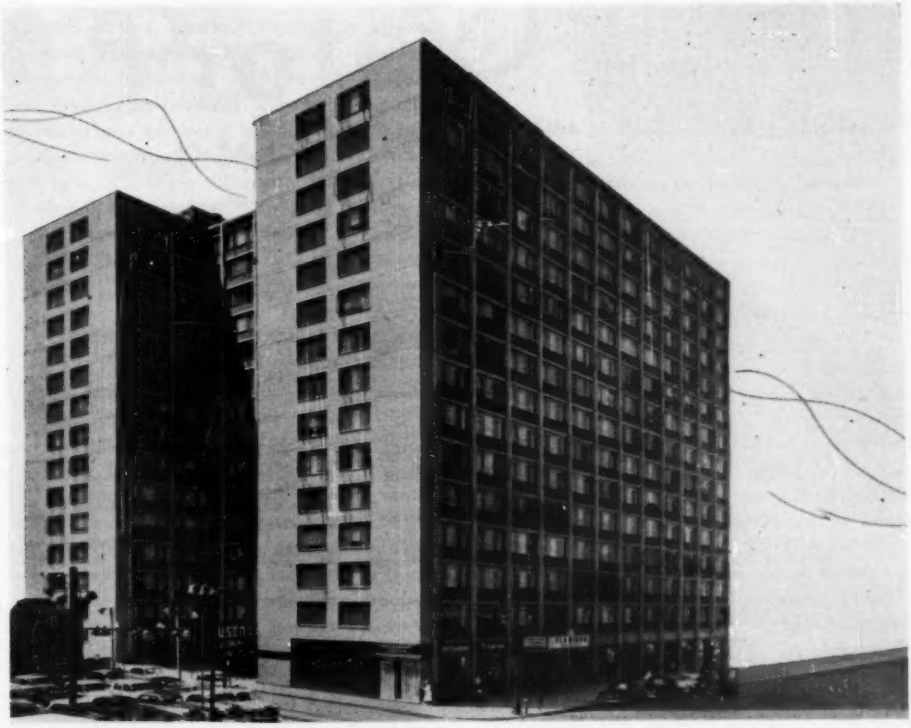

CONCRETE REINFORCING STEEL INSTITUTE

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Bartelsmeyer named chief highway engineer

Ralph R. Bartelsmeyer, former field engineer for Marquette Cement Mfg. Co., Chicago, Ill., has been named chief highway engineer by Governor Stratton of Illinois.

McElrath appointed sales manager

A. J. McElrath, formerly service engineer, has been appointed sales manager of Hermitage Portland Cement Co., Nashville, Tenn., succeeding E. W. McGovern, president in that position. A graduate of the University of Kentucky School of Engineering, Mr. McElrath has had many years of experience in the cement and concrete field. He previously served with the Kentucky State Highway Department, the Corps of Engineers, and the Tennessee Valley Authority. He has been associated with the Hermitage Portland Cement Co. since 1947.

Thin-shell conference held at MIT

To stimulate interest in, discuss features of, and consider recent developments in thin concrete shells, the Massachusetts Institute of Technology, Cambridge, Mass., recently held on campus a conference on thin concrete shells which included their architectural design, structural design, and construction techniques.

Included in the first day's technical program were discussions of "The Shell as a Space Encloser," by Phillip Johnson, director, Architectural Division, Museum of Modern Art, New York, N. Y., and Felix Candela, architect, Mexico City, Mexico; and "Economics," by Charles S. Whitney, Ammann and Whitney, New York.

"Barrel Shells," by A. L. Parme, Portland Cement Assn., Chicago, Ill., and E. Molke, Preload Engineers, Inc., Arlington, Va.; "Domes," by M. Fornerod, Preload Co., Inc., New York, Robert Zaborowski, Roberts and Schaefer, Chicago, and J. V. Huddleston, Columbia University, New York; "Warped Surfaces," by Eric Reissner, MIT, Cambridge, and Felix Candela, architect, Mexico City, were the technical presentations the second day of the conference.

The third and last day saw presentation of "Construction Problems and Techniques," by Anton Tedesko, Roberts and Schaefer Co., Chicago, K. P. Billner, Vacuum Concrete, Inc., Philadelphia, Pa., John H. Hession, National Gunite Corp., Boston, Mass., Roger H. Corbetta, Corbetta Construction Co., New York, M. J. Roach, Turner Construction Co., New York, and Godfrey Lutz, Turner Construction Co., New York. The program also included a talk on "Construction of the MIT Auditorium Shell," by Douglas Bates, George A. Fuller Co., Boston, and a conducted inspection tour of MIT's new auditorium which embodies a thin-shell concrete roof.

Goldbeck participates in panel discussion

A. T. Goldbeck, engineering director, National Crushed Stone Assn., Washington, D. C., recently participated in a panel discussion at Antioch College, Yellow Springs, Ohio, to examine the relationship between job experiences and Antioch's course for engineers. Several hundred employers and alumni attended the three-day conference to evaluate the college's study-plus-work plan, under which students regularly alternate classroom work with jobs secured for them. Antioch students have beem enployed as laboratory assistants at the National Crushed Stone Assn. since 1949.

New safety records set by cement manufacturers

New cement industry safety records were set in 1953, according to Ivan F. LeGore, safety director, Portland Cement Assn., Chicago, Ill. Analysis of 1953 accident figures showed that member companies of the PCA reported the largest number of accident-free plants in the 38 years cement industry safety records have been kept. The accident frequency and injury severity rates among association members were the lowest in the history of cement safety work.

The Portland Cement Assn. awards a safety trophy to member company plants operating a full calendar year without a lost-time accident. Of the 55 accident-free plants in 1953 (seven more than last year) 51 qualified for re-award of trophies won previously, one won a trophy for the first time, and three rated honorable mention. Prior to 1953, the highest number of accident-free plants was 54 in 1933 and 51 in 1948.

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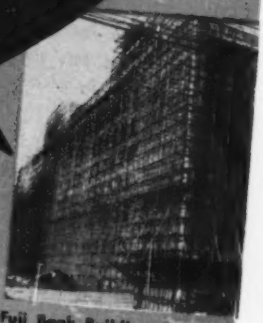

Fuji Bank Building, Tokyo, Japan. Economy in this new bank building was realized in initial cost and time—and appearance was permanently improved with Protex concrete.

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Problems and Practices

A series relating to "down-to-earth, every-day" concrete problems which attempts to give brief answers to the more common (and sometimes uncommon, too) questions asked about concrete design and construction practices.

To some, the answers will seem simple and obvious; others may prove to be extremely controversial.

All ACI members are invited to participate —either by submitting an inquiry, or even better, by telling JOURNAL *readers how an intriguing problem was solved. It may well be that readers will be able to suggest more practical solutions to inquiries than those presented.*

* * * * *

This month's problem stems from a recent "Problems and Practices" on use of steel mesh as reinforcement for concrete sidewalks and slabs on ground.

* * * * *

The use of steel mesh as reinforcement for concrete sidewalks and slabs on ground in the Mar. 1954 ACI JOURNAL* by M. W. Jackson, structural engineer, Boulder, Colo., deserves some comment.

We of course do not agree with Mr. Jackson that the purpose of mesh is to make it difficult for anyone to remove a small portion of the slab for repairs or that its function is to reinforce the dirt under the slab. Good inspectors insist that the contractor exercise a little care in the placing of the steel reinforcement, regardless of type. Perhaps, in the gas station slab referred to by Mr. Jackson as cracked into a worthless mass, the mesh was either left out or used to reinforce the dirt because of poor inspection.

On the constructive side and to "defend the use of mesh" in concrete ground slabs, as Mr. Jackson puts it, we have the following comments.

Concrete slabs on ground for residential construction

Concrete ground slabs are exposed directly to the elements, expanding and contracting with every change of temperature and moisture condition. They must of necessity be laid directly on the ground. The weight of the slab itself, plus the tendency of the ground to grip the concrete, creates resistance to expansion or contraction of the pavement slab. The inescapable external restraint against contraction tends to produce relieving cracks in the concrete slab. To safeguard the integrity of the concrete slab against this destructive effect of external restraint it is necessary to provide an adequate counteracting internal agent. This internal tension agent may be provided by incorporating within the concrete mass, a well distributed network of steel reinforcement which will hold all fine cracks close together as soon as they form and thereby prevent their progressive development.

It has long been known that concrete contracts when it sets up. Because of this contraction during the setting period, which is from the time of placement to final set, the concrete undergoes serious internal strains. These internal strains during the setting period occur at a time when the concrete is weak and usually results in incipient cracks in the concrete. Steel reinforcement performs an important function at this time in the life of the concrete. It actually distributes the shrinkage stresses in such a manner as to prevent many "eye visible" cracks from forming. Prevention of eye visible cracks is important, especially in a basement floor slab or a home utilizing a ground floor slab. A plain concrete floor slab cracked from shrinkage stresses is a grave liability to the home owner and will be a continued source of irritation and trouble.

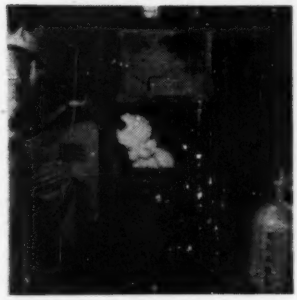
It has long been known that concrete slabs built on the ground are subject to changes in moisture content which causes an increased length in the slab. Research by the U. S. Bureau of Public Roads at the Arlington Experimental Station and on actual highway projects indicates that plain concrete slabs after ten years of service grow much more in length than slabs reinforced with steel. For example, records of a Bureau of Public Roads project at Stillesville, Ind., show that the steel reinforced concrete slabs increased in length only 1/16 in. per 100 ft in 10 years whereas plain concrete slabs at the Arlington Experimental Station increased ⅜ in. per 100 ft after 10 years.

Continued on p. 32

*"Problems and Practices," ACI *News Letter*, Mar. 1954, p. 14.

For Lightweight Structural and Insulating Concrete

THE MEARLCRETE SYSTEM FOR FOAM CONCRETE



Operator shooting a controlled amount of Mearlcrete foam into concrete mix.

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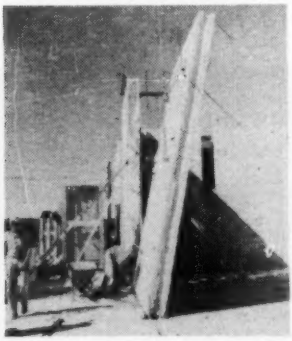

12" tilt up sandwich walls with 8" insulating foam concrete in center. *The Daual Farms, Inc., Princeton, Florida. Consulting Engineers: Lakeland Engineering Associates, Inc., Lakeland, Fla.*

The economical Mearlcrete System, using Mearlcrete Foam Liquid and Mearl foam generating equipment, is used to make foam concrete in any positively controlled density with preformed foam. It can be used with standard portland or high-early-strength cement, with or without aggregates. Mearlcrete foam blends easily with the concrete mix to provide a uniform cellular concrete with numerous lightweight structural applications, such as precast slabs, prestressed units, sandwich panels, etc. The foam concrete can be pumped, cast into intricate shapes, sawed, or nailed. It has the durability characteristics of concrete products and the fire resistance of insulating concrete. In addition, its excellent thermal insulating qualities make it valuable for site-casting for roofs, underground steam or refrigeration lines, and for fireproofing structural steel.

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Therefore, because it considerably reduces the total slab movement, the addition of steel to the concrete ground slab or basement slab will eliminate many undesirable wall, partition, and floor cracks caused from growth of the concrete slab.

We have mentioned that concrete shrinks when it sets, and when it shrinks, it generally cracks. Concrete also expands and contracts with temperature changes and changes in the moisture content of the air, and that leads to more cracks. Engineers explain the foregoing by saying that concrete, while strong in compression, is weak in tension. A concrete basement slab, for example, will take compressive loads without breaking, and will expand due to temperature rise without cracking. But if the temperature drops, the slab contracts and tension sets in as the concrete tries to draw in on itself causing it to crack. The warping and heaving of basement floors from differential temperatures between the top and bottom of the slab due to subsoil moisture conditions also sets up tensile stresses which can crack the slab.

By adding steel reinforcement to that slab, you add tensile strength, since steel is strong in tension. When the slab shrinks or contracts, or is subject to warping or twisting, the welded wire fabric resists the tensile stresses, and tends to hold tightly together or minimize any cracks that form. The use of the word "minimize" is deliberate as the function of the fabric is not to totally *prevent* cracks in concrete, but to keep them closed or minimized—render them harmless when they do occur. With the fabric holding the edges of the crack tightly together, for all practical purposes the crack is nonexistent, not unsightly, and not a source of potential trouble. In the unreinforced slab, however, there is no steel present to hold the edges of the cracks together, and thus they open up, become unsightly, allow water and dirt to enter from above and below the slab, and lead to progressive deterioration of the concrete. A cracked basement floor often means a wet, damp basement, a disgruntled home owner, and a reflection on the builder.

Obviously, the foregoing can be applied to any concrete slab placed on the ground. If it is important to minimize the cracks in the basement floor to have a dry house, what about the incipient cracks in the driveway? If driveway cracks are not held together by steel fabric, the wheel loads of the family car, heavy delivery vans, oil and coal trucks will speed the breaking up of the pavement (Fig. 1). Sidewalks, patios, garage floors, and terraces need welded wire fabric, too, for, although they don't carry heavy loads, they can crack and become unsightly due merely to weather, temperature, and moisture changes. The fabric in any concrete application is insurance that cracks will be minimized due to the distributed reinforcement, and kept in check.

Continued on p. 38

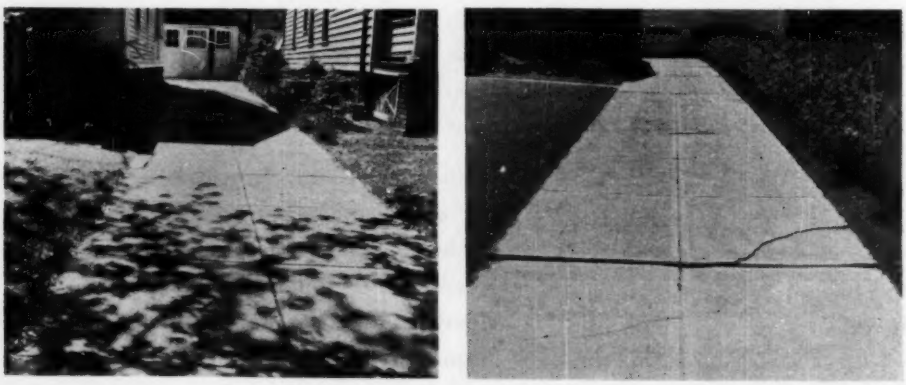
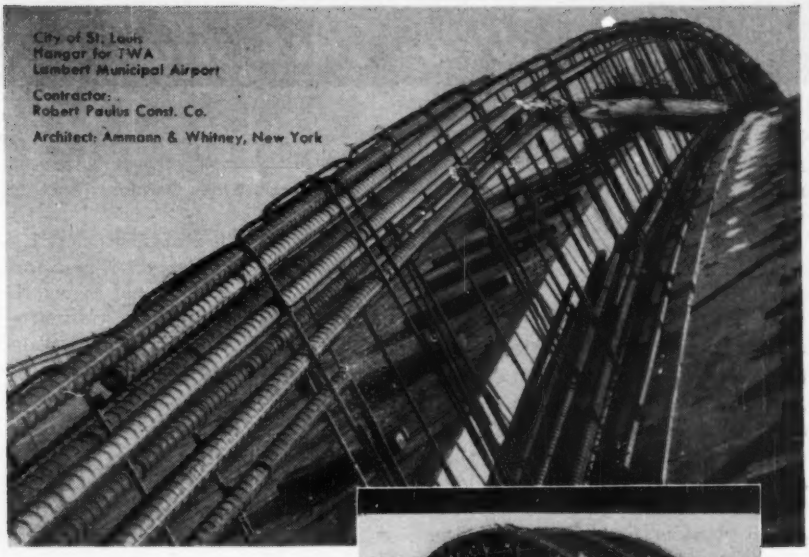
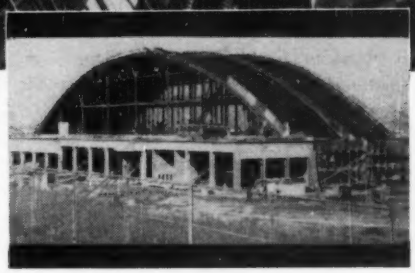


Fig. 1 (left)—Driveway reinforced with wire fabric for a two-family dwelling in Cleveland has supported moving vans and other trucks bringing in merchandise for two families for five years without cracking. Right—Plain concrete driveway, for a single-family home in the same neighborhood, was laid one year ago and it has not carried as much traffic as the two-family driveway. It has cracked and faulted





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Who's Who This Month

Rudolph C. Valore, Jr.

Part 2 of Rudolph C. Valore's paper, "Cellular Concretes," appears on p. 817. Mr. Valore's biographical sketch appeared on p. 21 of the May 1954 "News Letter" in connection with the publication of Part 1 of his paper.

D. F. Billet and J. H. Appleton

"Flexural Strength of Prestressed Concrete Beams," p. 837, is described by Ensign D. F. Billet, military coordinator, Structures Research Department, U. S. Naval Civil Engineering Research and Evaluation Laboratories, Port Hueneme, Calif., formerly research assistant in civil engineering, University of Illinois, Urbana, Ill., and J. H. Appleton, research associate in civil engineering, University of Illinois, Urbana.

Ensign Billet received a BS degree in civil engineering from Syracuse University in 1951, and a MS degree from the University of Illinois in 1953. While attending the University of Illinois he held a research assistantship in the Engineering Experiment Station where he was engaged in research dealing with the investigation of prestressed concrete beams.

In September, 1953, he received a commission in the Civil Engineer Corps of the U. S. Navy. In addition to his being a member of ACI, Ensign Billet is a member of ASCE, Sigma Xi, Tau Beta Pi, and Gamma Alpha.

Mr. Appleton, in immediate supervision of investigation of prestressed concrete for highway bridges, has held his present position at the University of Illinois since 1951. He received a BS degree in civil engineering from Alabama Polytechnic Institute in 1947, and a MS degree from the University of Illinois in 1949. Currently he is writing his thesis for his PhD degree at the University of Illinois.

From 1947-49 Mr. Appleton was research assistant in theoretical and applied mechanics, University of Illinois. From 1949-50 he worked as a structural engineer in the Physical Research Branch, U. S. Bureau of Public Roads, Washington, D. C. He was an instructor in the Department of Civil Engineering, North Carolina State College, Raleigh, N. C.

Mr. Appleton is a member of ACI, ASCE, Chi Epsilon, Tau Beta Pi, Phi Kappa Phi, Omicron Delta Kappa, and Sigma Xi. He is a member of ACI-ASCE Committee 321, Design of Reinforced Concrete Slabs, and ACI Committee 711, Precast Floor Systems for Houses.

J. John Brouk

J. John Brouk, author of "Perlite Insulating Concrete," p. 857, is president, Precast Slab & Tile Co., and J. J. Brouk & Co., both of St. Louis, Mo.

After receiving a BS degree in ceramic engineering from the University of Illinois in 1938, Mr. Brouk became associated with the Hydraulic Press Brick Co. in their Haydite lightweight aggregate department. He became manager in 1940.

In 1942 he was elected vice-president of the Precast Slab and Tile Co., and in 1943 he entered the service of the U. S. Navy and was attached to the U. S. Navy Research Laboratory, Washington, D. C., under special assignment on research projects. He was released from service in 1946 and returned to the employment of the Precast Slab & Tile Co.

In May, 1954, Precast Slab & Tile Co. was merged with the Federal Cement Tile Co., Chicago, Ill., and Mr. Brouk was elected a vice-president of that company. He has been active in the lightweight aggregate and lightweight concrete fields for the last 16 years.

Phil M. Ferguson, Robert D. Turpin, and J. Neils Thompson

"Minimum Bar Spacing as a Function of Bond and Shear Strength," p. 869, is presented by Phil M. Ferguson, Robert D. Turpin, and J. Neils Thompson, Department of Civil Engineering, University of Texas, Austin, Texas.

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ACI to publish bibliography on prestressed concrete

ACI-ASCE Joint Committee 323, Prestressed Concrete, has compiled a bibliography on prestressed concrete containing approximately 2000 references, 1896–1953, including patents.

The Institute is planning to publish this bibliography later this year at a price of about $2 per copy. To aid ACI headquarters in determining the quantity needed, if you want a copy for your library, please fill out the coupon below and mail to ACI headquarters in Detroit.

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Ferguson is a Director of the Institute and is a member of the Technical Activities Committee, ACI Committees 115, Research; 318, Standard Building Code; and ACI-ASCE Committee 321, Design of Reinforced Concrete Slabs.

After graduating from the University of Texas in 1922 and receiving master's degrees from the University of Texas in 1923, and the University of Wisconsin in 1924, he spent several years with Dwight P. Robinson and Co. of New York, N. Y., in structural design of power plants and industrial buildings and construction of hotels and apartment buildings.

Professor Ferguson returned to the University of Texas as associate professor in the field of structures and materials in 1928. He was raised to the rank of professor in 1939 and was made chairman of the civil engineering department in 1943.

Professor Turpin graduated from Amarillo Junior College, Amarillo, Texas, in 1941. In 1942 he entered the U. S. Army Corps of Engineers and was released to inactive duty in 1946 as a captain. He entered the University of Texas, College of Engineering, in 1946 and received a BS degree in civil engineering in 1948, and MS degree in civil engineering in 1949 with a major in concrete structures.

For the past five years he has been on the faculty of the Department of Civil Engineering, University of Texas, and during 1951-53 was a part-time faculty research engineer. During this period he was engaged in research on reinforced concrete design under contract with the U. S. Navy Bureau of Yards and Docks. He is currently on leave while working toward a PhD degree in the Institute of Geodesy, Photogrammetry, and Cartography at Ohio State University, Columbus, Ohio.

Professor Thompson is in charge of the materials laboratories of the civil engineering department at the University of Texas, and is also director of the Balcones Research Center. As director he is in charge of the coordination and development of the center established at the International Minerals and Chemical Co. magnesium plant in Austin. The plant was taken over by the University of Texas and about 20 research laboratories established for research in geology, physics, electronics, and engineering.

After graduation from the University of Texas in 1935, Professor Thompson worked for the Materials and Tests Division, Texas Highway Department. He joined the university staff in 1941. He is president of the Texas Society of Professional Engineers; a member of ACI, ASCE, ASEE, HRB, Asphalt Paving Technologists, and the Society for Experimental Stress Analysis.

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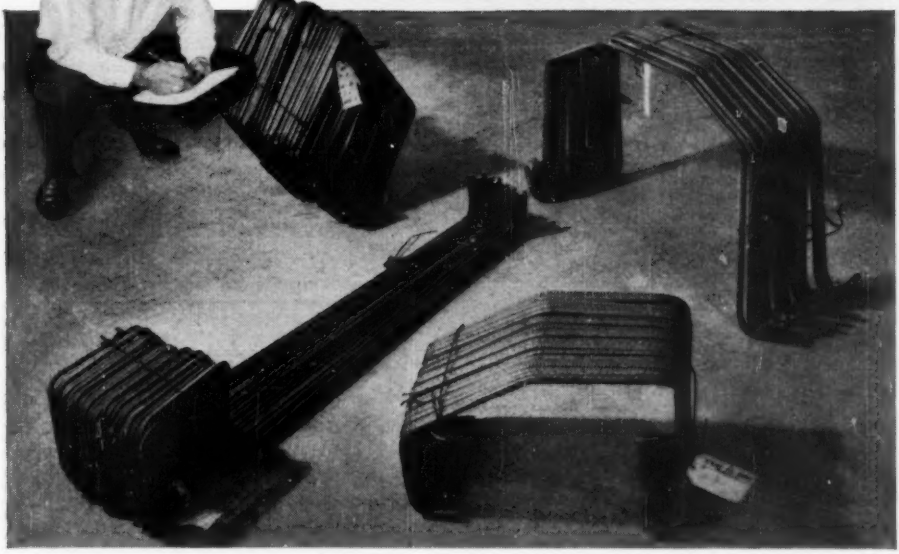

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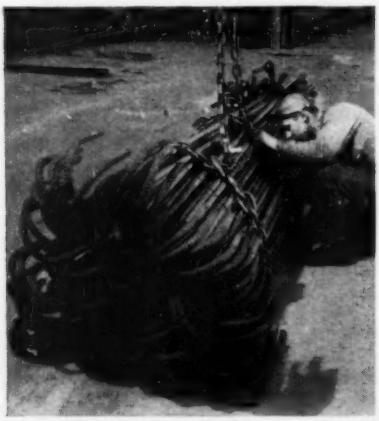

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Problems and Practices

Continued from p. 32

Actual cost of steel reinforcing material is low. For example, fabric for the basement floor of an average home, 20 x 40 ft; garage, 15 x 30 ft; and driveway and sidewalk, both over 40 ft long, costs well under $50. Less than a quarter of a percent protects a typical $20,000 investment and guards against the cracking and deterioration so often seen in plain concrete work.

Because of the quality added to the home when the concrete is reinforced with steel fabric, which practically eliminates concrete maintenance costs, the prospective home owner should be adequately protected by building code specifications that require steel reinforcement in all concrete slabs placed on ground in residential construction.

FRANK B. BROWN, Managing Director, Wire Reinforcement Institute, Inc., Washington, D. C.

New developments in walls, floors, and roofs

In an attempt to give a capsule review of new developments and materials for walls, floors, and roofs, 11 national authorities addressed the 1954 Construction Conference sponsored by the Cleveland Engineering Society recently in Cleveland, Ohio. The conference covered new developments and building trends in floor and roof surfaces including use of oxychloride cements. Papers presented included one on "Design and Construction of Concrete Masonry Structures," by R. E. Copeland, director of engineering, National Concrete Masonry Assn., Chicago.

Errata

The following correction should be made in "Basic Design Criteria for Concrete Gravity and Arch Dams," ACI JOURNAL, April, 1954.

p. 667—the third sentence under "Combinations of loadings—Criteria" should read as follows:

"..... load combination (D below) and the smaller safety factor prescribed used."

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Addendum

In the pictorial series, "Notable Concrete Structures—Old and New," ACI JOURNAL, Feb. 1954, p. 524, the following information should be added to the material on the Walnut Lane Memorial Bridge, Philadelphia, Pa. G. Magnel and F. G. Riessauw were consultants to Preload Engineers, Inc. The Blaton-Magnel prestressing system was used.

Looking ahead to 1955

With the successful completion of the 1954 convention in Denver, ACI's Technical Activities Committee is already looking toward the 1955 meeting in Milwaukee and planning the program.

All those who have in mind offering papers for presentation at the 51st annual meeting should write to Institute headquarters no later than July 1, furnishing a synopsis which should make clear the intended scope of the paper and indicate features that, in the opinion of the author, will justify its inclusion in the program. Contributors should be prepared to have first drafts of manuscripts in the hands of the Technical Activities Committee for appraisal and acceptance by Sept. 15, 1954, and final manuscripts by Jan. 1, 1955.

From the replies received and suggestions from other sources, TAC will select the papers to make up each convention session. Write Institute headquarters about that contribution *you* believe merits a place on the program.

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New Members

The Board of Direction approved 33 Individual applications, 9 Juniors, and 5 Students making a total of 47 new members. Considering losses due to resignations, deaths, and nonpayment of dues, the total membership for the month of April is 6443.

Individual

AHN, KYUNG MO, Seoul, Korea (Chf. Constr. Engr., Ministry of Trans., Republic of Korea)
ALIMENTO, ISIDORO A., San Francisco, Calif. (Chf. C. E., Rogers Engrg. Co., Inc.)
ALLEN, HAROLD, Washington, D. C. (Dir. Lab. & Field Investigations, U. S. Bureau of Public Roads)
ANDERSON, EWALT, Las Vegas, Nev. (Struct. & C. E.)
ARUS, HANS JOHANNES, Toronto, Canada (Struct. Des., Abitibi Power & Paper Co., Ltd.)
BALSARA, N. S., Mbeya, British East Africa (Cons., Civil & Struct. Engr.)
BRASELTON, GUY, Corpus Christi, Texas (Pres. & Gen. Mgr., Braselton Constr. Co.)
CAMPBELL, RICHARD HORTON, Cleveland, Ohio (Field Engr., Master Bldrs. Co.)
CRUZ, CONRADO P., San Francisco, Calif. (C. E. Asst., Rogers Engrg. Co., Inc.)
DEDDENS, RAYMOND HARRY, Van Nuys, Calif. (Struct. Engr.)
GHARAVI, ALI AKBAR, Denver, Colo. (USBR)
GUNSALLUS, DAVID W., Buffalo, N. Y. (Struct. Engr., J. Fruchtbaum)
HENNESSY, JOHN C., Norwalk, Ohio (Soils, Mtls. Engr., Hardesty & Hanover)
HICKS, J. NELSON, Wilkes-Barre, Pa. (Sales Mgr., Stressteel Corp.)
HILL, HAROLD M., Longview, Wash. (Gen. Contractor)
JOSEPH J. MARVIN, Pasadena, Texas (Constr. Supt., Pioneer Industrial Co.)
KATO, MUTSUMI, Tokyo, Japan (Prof., Tokyo Inst. of Technology)
MASON, C. KEITH, So. Gate, Calif. (Partner, Caldwell, Mason & Muntz)
MCCONNELL, MILLER, Highland Park, Mich. (Arch.)
PAINTER, WILLIAM DONALD, Urbana, Ill. (Asst. Prof. of C. E., Univ. of Tenn.)
PARK, B. F., Ottawa, Kan. (Gen. Sales Mgr., Builder, Inc.)
REESE, CHARLES E., Montpelier, Ohio (Soils & Foundation Engr., William McFarland, Binghamton, N. Y.)
RICE, C. W., Asheville, N. C. (Bldg. Engr., American Enka Corp., Enka, N. C.)
ROBSON, THOMAS DAVID, London, England (Director, Lafarge Aluminous Cement Co., Ltd.)
RUBIN, HENRY H., Chicago, Ill. (Est. & Outside Job Supv., Arco Constr. Co.)
ST. CLAIR, WILLIAM T., Richmond, Va. (Cons. Engr.)
SCHULTZ, HAROLD B., Juneau, Alaska (Chf., Engrg. Div., Dept. of Interior, Alaska Rd. Comm.)
SNYDER, CPL. JULIAN, Army Chemical Center, Md. (C. E. Asst., J. Fruchtbaum)
STAMER, SALOMON, Toronto, Canada (Engr., Canadian Brazilian Services Ltd.)
VAN RAY, JACK, Houston, Texas (Struct. Des., Fraese, Nichols & Turner)
WEST, ANDREW, Dayton, Ohio (Sales Mgr., Snyders Concrete Products, Inc.)
WISE, V. L., Cleveland, Ohio (Pres., The Garland Co.)
ZAMBRANO, RAUL G., Bogota, Colombia (C. E.)

Junior

CREPEAU, CLAUDE L., Greenfield, Mass. (C. E., Mass. Dept. of Public Wks.)
HIGGS, JERE W., Jr., Baton Rouge, La. (Engr., Pyburn & Odom)
HOUSTON, CALVIN E., Brookhaven, Ga. (Jr. Bridge Des., Ga. State Highway Dept.)
LEWIS, J. A., Scarsdale, N. Y. (Const. Supt., Gerard Lollo & Sons)
O'DONOVAN, JOHN, Cork., Eire (Concrete Control Engr., Electricity Supply Board, Ireland)
OSTERLING, ALLEN W., Dixon, Ill. (Field Engr., PCA)
SARRIA, LEOPOLDO HERRERA, Caracas, Venezuela (C. E.)
SEAMAN, BRUCE L., New York, N. Y. (Gen. Contracting, Turner Constr. Co.)
SINGLE, W. L., Halifax, Canada (Gen. Mgr., Rankin Maritime Co., Ltd.)

Student

CORCUERA, ROMOLA A., Ann Arbor, Mich. (Univ. of Mich.)
DALLAM, LAWRENCE N., Columbia, Mo. (Univ. of Mo.)
KHAN, FAZLUR R., Urbana, Ill. (Univ. of Ill.)
RODRIGUEZ, CESAR R., Boston, Mass. (MIT)
VILLARREAL, CELESTINO R., Austin, Texas (Univ. of Texas)

Honor Roll

February 1—April 30, 1954

The top three places on the Honor Roll for "member-getting" are retained by the same ACI members who held them last month. However, Raymond E. Davis has stepped up to 19 credits while Lewis H. Tuthill with 8 credits and Grant Bloodgood with 4 credits remain the same.

This is YOUR source of knowledge ..... expand it!

The new member YOU propose may bring important information to ACI and certainly ACI will give generously to him from its reservoir of technical data.

Raymond E. Davis	19
Lewis H. Tuthill	8
Grant Bloodgood	4
Robert F. Adams	3
V. J. Cespedes	3
Herbert K. Cook	3
Samuel Hobbs	3
John J. Hogan	3
Henry L. Kennedy	3
Adrian Pauw	3
C. H. Scholer	3
Edwin C. Anderson	2
Earl I. Brown	2
Carlos D. Bullock	2
Thomas Cholnoky	2
Elmo C. Higginson	2
Raja Iliya	2
J. W. Kelly	2
R. G. King	2
L. D. Long	2
James A. McCarthy	2
William McGuire	2
F. N. Menefee	2
C. J. Posey	2
Leo W. Schmidt	2
Howard Simpson	2

Mete Sozen 2
J. W. Tinkler 2
Frank E. Watson 2
Arthur G. Wood 2

Charles A. Maguire

Charles A. Maguire, founder and senior partner of Charles A. Maguire and Associates, Providence, R. I., died recently. From 1911 to 1933, Mr. Maguire was a member and president of the Charles B. Maguire Co., a building firm founded by his father. He then served as Commissioner of Public Works for Providence and chairman of the Metropolitan Sewer Commission. In 1937 he organized Charles A. Maguire and Associates, which has been engaged on the design of the Mystic River Bridge, Boston, Mass.; naval installations at Newport and Quonset Point, R. I.; the proposed freeway through Greater Providence, and the Tiverton-Portsmouth Bridge.

Meier G. Hilpert

Meier G. Hilpert, president and treasurer of Hilpert Developments, Bethlehem, Pa., died early this year. Retiring in 1945 after 42 years of continuous service with the Bethlehem Steel Co., Mr. Hilpert organized Hilpert Developments. As a lieutenant commander in the U. S. Navy during World War II he assisted in the development of F. R. Harris sectional floating dry docks. Mr. Hilpert was an alumnus of the State University of Iowa and Cornell University. He had been an ACI member since 1942.

Roy S. Moore

Roy S. Moore, former civil engineer with the Public Works Division, U. S. Navy Bureau of Yards and Docks at the Brooklyn Navy Yard, Brooklyn, N. Y., died recently. Mr. Moore, who had been at the Navy Yard for 13 years, was previously employed by the New York Department of Parks, the New York and New Jersey Bridge and Tunnel Commission, the Port of New York Authority, J. A. L. Waddell, consulting engineer, and Mason & Hanger Co., New York contractors. He was an alumnus of Pennsylvania State College. He had been an ACI member since 1927.

Cecil B. Hopkins

Cecil B. Hopkins, founder and president of the Steelform Contracting Co., San Francisco, Calif., died recently. Prior to the establishment of the Steelform company in 1918, Mr. Hopkins was a structural engineer for the McClintic-Marshall Co., Pittsburgh, Pa., and the Truscon Steel Co., Detroit, Mich., and chief engineer for the Concrete Engineering Co., Omaha, Neb., and Pacific Coast manager for the firm in San Francisco. He was a 1907 graduate of Cornell University. He had been an ACI member since 1940.

George L. Mylchreest

George L. Mylchreest of the consulting engineering firm of Mylchreest and Reynolds, Hartford, Conn., died recently. Previously he was with the engineering firm of Buck and Sheldon, Hartford. He was educated at Wesleyan University and the Massachusetts Institute of Technology, where he took his degree in civil engineering.

Tools, Materials, Services

Under this heading note will be made from time to time of producer literature of presumed technical interest (and available from its source for the asking) to ACI users of tools, equipment, materials, accessories, and special services.

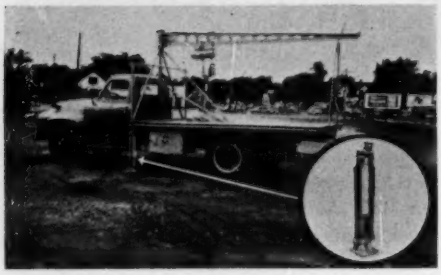
New sintering division

Sintering Machinery Corp. announced recently the formation of a new division which will devote its efforts to the design, construction, and sale of lightweight aggregate sintering plants and related process equipment. Operating under Dwight-Lloyd, Inc., the new company takes its name from the inventors of the sintering process who also founded Sintering Machinery Corp.—Dwight-Lloyd, Inc., Division of Sintering Machinery Corp., Netcong, N. J.

Corrosion-resistant cements

The Corrosion Engineering Products Department of Pennsalt Chemicals has announced an all-purpose cement called "Pennsalt Furan cement," which is said to provide greater chemical resisting properties, superior physical strength, and economy with the stability and nontoxic qualities of ordinary furfuryl alcohol type cements.

Two formulations are available: powder S, a siliceous filler, is resistant to acids (except hydroflouric), solvents, oils, grease, water, steam, and mild alkalies; powder C is a carbon type filler, an effective resistant for broad acid and alkali protection including hydroflouric acid.—Corrosion Engineering Department, Pennsalt Chemicals, 1000 Widener Bldg., Philadelphia 7, Pa.



Hydraulic jack out-riggers

Addition of power-operated hydraulic jack out-riggers to the Bros Magic Muscle concrete block handler to assure quick and easy stabilization of truck beds has been announced recently by William Bros. Boiler and Manufacturing Co. This feature is said to make possible fast and smooth block handling with minimum effort by the operator.

Jacks are positioned on each side or at forward corners of the truck bed, depending upon location of Magic Muscle boom and mast. Power to operate these jacks independently is supplied by a hydraulic power pack. It is located in the electric generating plant compartment of the unit.

The Bros Magic Muscle now permits one man to handle 700-lb block loads with ease. It fits all truck beds from 12 to 27 ft in length. Complete unit only weighs approximately 1000 lb. Brochure No. RE-130 is available.—William Bros. Boiler and Manufacturing Co., 1001 Tenth Ave., S. E., Minneapolis 14, Minn.

1953 supplements to ASTM standards

The American Society for Testing Materials recently announced the availability of the 1953 supplements to the 1952 book of ASTM standards. Together with the big book of ASTM standards issued triennially, they give in their latest form all specifications, tests, and definitions, excepting the chemical analysis of metals. —American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., at $3.50 per part—or $24.50 for the complete set of seven parts.

Basement waterproofing

In a one-page folder, illustrated with before and after photographs, Pioneer Latex and Chemical Co., describes Sta-Crete, another in its line of pure latex rubber products, as a heavy-duty waterproofing compound which is said to be effective in deep cellars and other areas where conventional waterproofing compounds fail. In addition this product is said to provide an attractive nondusting finish in red, green, white, or gray-green.—Pioneer Latex and Chemical Co., Lincoln Blvd., Middlesex, N. J.

Concrete form support

Webrib Steel Corp. has issued a booklet entitled "Hico Girders," which describes lattice-girder units of various lengths designed for form support in construction of reinforced concrete or precast block floors, ceilings, and arches. Lightweight, varying lengths, use of untrained labor, and re-use are some of the advantages claimed for these girders.—Webrib Steel Corp., 120 Broadway, New York, N. Y.

Transit mixer

Imperial Construction Equipment Co. has released a bulletin "Imperial Hydrocreter—An Entirely New Kind of Transit Mixer," which describes the company's transit mixers and agitators. The 5½-cu yd mixer is said to combine weight saving features, performance, driver convenience, and ruggedness for maximum efficiency. In addition to Imperial's standard mixer line, 6¼- to 7½-cu yd agitators are introduced with, in general, a 4 rpm top drum speed requiring approximately 20 hp. An important feature, claimed by the manufactarer for the agitators, is the low speed and horsepower required, made possible by the company's patented maximum flow discharge blade design.—Imperial Construction Equipment Co., 3400 Lake St., Melrose Park, Ill.

Waterproofing and decorating concrete masonry

An eight-page brochure describing latest methods of combining decoration with protection of all types of masonry surfaces, including concrete, cement block, stucco, brick, and cinder block has been released by Prufcoat Laboratories, Inc. In addition to up-to-date procedures described in this brochure, Pruftite masonry paints are detailed in terms of specific properties and user benefits. The brochure also contains descriptions and illustrations of additional masonry waterproofings made by Prufcoat Laboratories.—Prufcoat Laboratories, Inc., 50 East 42nd St., New York 17, N. Y.

Prestressing

Prestressing Inc. has released a leaflet entitled "The PI Method" which explains that organization's post-tensioning method for prestressed concrete utilizing duplex-headed wire. The duplex feature stems from upset heads formed near the ends and midpoint of hard-drawn high-tensile steel wire as a means of prestressing the wire.—Prestressing, Inc., Transit Tower, San Antonio, Texas.

Powder-actuated tools film

The Powder Actuated Tool Manufacturers' Institute, Inc., recently announced availability of a 10-min., 35-mm color film entitled *The Story of Powder Actuated Fastening*. Designed to explain the basic applications and uses of powder actuated tools, the film is available on a loan basis for use by trade associations, safety organizations, employee groups, technical schools, and other interested organizations.

Briefly, the film shows how powder actuated tools can save time and money in construction and maintenance fastening jobs. Using the power of cartridges as a propellant, they drive steel studs or pins into concrete or steel. Basic applications include fastening wood to concrete and steel, steel to steel, steel to concrete, and fabricated materials to steel and concrete.

The Institute also announced the availability of a booklet based on the film which tells the same story by means of photographs and accompanying text.—Richard F. Webster, Secretary, Powder Actuated Tool Manufacturer's Institute, Inc., 250 East 43rd St., New York 17, N. Y.

Errata

The following correction should be made in "Concrete Form Clamp," ACI JOURNAL, Mar. 1954, *News Letter*, p. 27. The first sentence should read: "..... requiring only a light tap with a singlejack hammer."

Membership in the American Concrete Institute

To facilitate prospective members in joining the Institute, membership application forms are provided. Present Members may aid by bringing these forms to the attention of those who may profit from membership advantages. The grades of membership are described overleaf.

All who have an interest in concrete and a desire to improve it through a nonprofit educational service in gathering, correlating, and disseminating information on design, construction, manufacture, use, and maintenance of concrete structures and products are eligible for Institute membership.

There are many opportunities in the Institute for technical committee activity, contributions from your experience in technical papers and the briefer "Letters from Readers" section, and in reviewing technical literature. Thus you can help further ACI's aim "to provide a comradeship in finding the best ways to do concrete work of all kinds and in spreading that knowledge," and at the same time benefit from the experiences of other Members.

(cut here)

Board of Direction, American Concrete Institute
18263 W. McNichols Road
Detroit 19, Michigan

Date_____

Individual Members, North America and U. S. Possessions	**$15.00**
Individual Members elsewhere	**12.00**
Corporation Members	**50.00**
Contributing Members	**100.00**
Junior Members—nonvoting (under 28)	**7.50**
Student Members—nonvoting (under 28)	**5.00**

(Subject to stipulations of Bylaws—Article I on reverse side. Bylaws on request.)

Of the annual dues, $12.00 is for the JOURNAL of the American Concrete Institute (except that dues for Junior and Student Members apply in full for the JOURNAL).

The undersigned hereby applies for_____**membership**
(Individual, Corporation, Contributing, Junior, Student)

in the American Concrete Institute. Proposed by_____

For Corporation Membership, ACI representative will be_____

_____ _____
(Date of graduation if Student) (Name, if Corporation)

Signature_____

For our records, please complete both sides of application.

EXCERPTS FROM BYLAWS: ARTICLE I—MEMBERS

Section 1. This Institute shall consist of Members, Corporation Members, Contributing Members, Junior Members, Student Members and Honorary Members interested in furthering the Institute's objects as set forth in its Charter.

Sec. 2. A Member shall be an individual.

A Corporation Member shall be a firm, corporation, society, agency of government or other organization. A Corporation Member shall name one individual as its representative who will enjoy all membership rights and privileges.

A Contributing Member shall be an individual, firm, corporation, society, agency of government or other organization wishing to give larger support to Institute activities through the payment of larger dues. Contributing Members, other than individuals, shall name representatives as do Corporation Members.

A Junior Member shall be a person less than 28 years old.

A Student Member shall be less than 28 years old and a student in residence at a recognized technical or engineering school.

An Honorary Member shall be a person of eminence in the field of the Institute's interest, or one who has performed extraordinarily meritorious service to the Institute.

Sec. 3. All classes of Members except Honorary Members and Student Members, shall be proposed by at least one Member of the Institute and elected by a two-thirds vote of the Board of Direction. An Honorary Member shall be elected by unanimous vote of the Board of Direction. A Student Member shall be proposed by a member of his school's faculty, who need not be a Member of the Institute, and elected by a two-thirds vote of the Board of Direction.

Sec. 4. All Members shall have all rights and privileges of membership as determined by the Board of Direction except that a Junior or Student Member shall not vote nor hold office. The status of a Student Member shall change automatically to that of Junior Member on the first anniversay of his membership succeeding the date on which he ceases to be a student in residence. The status of a Junior Member shall be changed to that of Member on the first anniversary of his membership after he becomes 28 years of age.

Sec. 5. Applications for and resignations from Membership and requests for change of representatives of Corporation or Contributing Memberships shall be presented in writing to the Secretary-Treasurer. Resignations may be accepted only from Members whose dues are not more than 60 days in arrears, except by special action of the Board of Direction.

(cut here)

Name _____
Please Print

Date of Birth _____
Month Day Year

Title or Position _____

Name of Firm or Organization _____

☐ **Business Address** _____

☐ **Resident Address** _____
(Please check address to which you wish mail and publications sent)

Nature of Firm's Business _____

DON'T FORGET—

there will be no JOURNAL issues in July and August.

The next issue you receive will be September, 1954.

ACI Synopses, Proceedings Volume 50 September 1953—June 1954 ACI

Herein are listed synopses of the papers and reports published in JOURNAL OF THE AMERICAN CONCRETE INSTITUTE Proceedings V. 50 which are available in convenient separate prints at nominal prices for specialized reading. Papers listed are examples of the 720 similar JOURNAL papers and reports listed in the ACI 20-Year Index.

MINIMUM STANDARD REQUIREMENTS FOR PRECAST CONCRETE FLOOR UNITS (ACI 711-53).....50-1

Price 50 cents (in special covers)

ACI COMMITTEE 711—Sept. 1953, pp. 1-16 (V. 50)

These minimum standard requirements for precast concrete floor units are to be used as supplements to the ACI "Building Code Requirements for Reinforced Concrete (ACI 318-51)." These standard requirements cover five different types of precast concrete floor units: (1) I-beam type, with either cast-in-place or precast slab; (2) hollow core type; (3) assembled concrete block type; (4) precast inverted T-beam joist with precast filler block between; and (5) integrally precast slab and T-joist. An appendix contains applicable sections of the ACI Code (ACI 318-51).

CONCRETE FOR RADIATION SHIELDING.....50-2

Price 50 cents.

EDWIN J. CALLAN—Sept. 1953, pp. 17-44 (V. 50)

Concrete for shielding nuclear radiation is discussed, with emphasis on factors related to concrete technology and cost. The mechanics of radiation shielding is presented briefly, and data regarding concrete for shielding are reviewed. Tables and curves of concrete thickness required for shielding are given for both ordinary and heavy concrete. Problems involved in the use of special concrete are discussed. An outline of a procedure for designing concrete shielding is presented.

ABSORPTION BY CONCRETE OF X-RAYS AND GAMMA RAYS.....50-3

Price 50 cents.

B. E. FOSTER—Sept. 1953, pp. 45-64 (V. 50)

The mechanism of the absorption of x-rays and gamma-rays by various shielding materials is discussed. A review of the experimental work performed by the National Bureau of Standards to establish data with which concrete barriers may be designed is presented. A brief discussion of the methods used in protective barrier design is included and the relative merit of several barrier materials, including heavy concretes, is discussed.

EFFECT OF SUSTAINED OVERLOAD ON THE STRENGTH AND PLASTIC FLOW OF REINFORCED CONCRETE BEAMS.....50-4

Price 35 cents.

G. W. WASHA and P. G. FLUCK—Sept. 1953, pp. 65-72 (V. 50)

Research on the plastic flow of reinforced concrete beams has been in progress at the University of Wisconsin since 1941. Results of several past programs have been previously reported, and additional programs are now in progress. This paper presents the test results obtained from overload tests of beams which had previously been subjected to a three-year period of sustained design load. Eighteen beams were tested, involving three conditions of reinforcement in each of three different sizes. The control beam of each pair was tested during a 1-hr period by increasing the uniform load in increments until the ultimate load was reached. The other beam of each pair was subjected to a high and periodically increased overload for a period of about one year and was then loaded to ultimate.

The beams subjected to the high sustained overload suffered considerable plastic flow, but the ultimate strength was not appreciably different from that of companion control beams.

ECONOMICAL DESIGN OF PRE-STRESSED CONCRETE BEAMS.....50-5

Price 50 cents.

DAVID P. BILLINGTON—Sept. 1953, pp. 73-88 (V. 50)

The ability of simply supported post-tensioned concrete beams to span more than 150 ft makes it important that such members be designed for maximum economy. This paper shows the effects of varying the cross-sectional shape and size on the load capacity of any form of post-tensioned beam. The parts of the cross section above and below the center of gravity of the entire concrete section are analyzed separately.

PROPOSED RECOMMENDED PRACTICE FOR SELECTING PROPORTIONS FOR CONCRETE.....50-6

Price 50 cents.

ACI COMMITTEE 613—Oct. 1953, pp. 105-120 (V. 50)

The proportioning of concrete, including mixes containing entrained air, is set forth in this recommended practice. Tables are provided which, along with laboratory tests on physical properties of fine and coarse aggregates, yield information rapidly for obtaining concrete proportions. Three examples are included in the design of air-entrained and non-air-entrained mixes which utilize the tables. Correction of aggregate proportions due to moisture present in aggregates is illustrated. Laboratory tests are given in the appendix and include those on physical properties of cement and aggregate. Also included is a simple method of obtaining mix proportions for the small job.

DEVELOPMENT OF A CELL FOR THE INSTALLATION OF ELECTRICAL RESISTANCE STRAIN GAGES IN CONCRETE.....50-7

Price 50 cents.

HERBERT E. WORLEY and RICHARD C. MEYER—Oct. 1953, pp. 121-136 (V. 50)

These investigations were conducted to develop a method of adapting SR-4 electrical resistance strain gages for measurement of strains in concrete pavements. Previous experiments in which SR-4 gages were incorporated in cells which could be cast internally in concrete indicated that some new waterproofing technique would have to be found which would extend the useful life of such installations.

SR-4 gages having a 6-in. gage length were found to indicate strain values which were much more consistent than did shorter gage lengths when used on concrete containing coarse aggregate.

A number of experimental cells were made and tested before one was developed that measured strains satisfactorily. The SR-4 gages for this gage cell were cemented between the flattened walls of an expanded portion of $\frac{3}{8}$- or $\frac{1}{2}$-in. copper tubing. The copper tubing extended the length of the gage leads and was filled with Petrosene wax to keep moisture from entering the gage cell.

Specimens in which these thin-walled copper gage cells were cast were tested in the laboratory in compression and in flexure. Strains measured with internal gages compared favorably with those found by similar surface gages with no apparent reinforcing of the concrete by the gage cells. Consistency of strain values indicate a good bond between concrete and gage cell. Two rosettes of two gages each were cast in a pavement and a strain investigation was made to determine the workability of these gages. Strains due to a 20,000-lb axle moving load at various speeds and in several wheel lanes were recorded satisfactorily.

After having been installed in a concrete pavement for ten months the gages have manifested no decrease in gage cell resistance. It is believed that gages of this type are waterproof and will remain serviceable for a long time.

FAILURE OF CONCRETE UNDER COMBINED TENSILE AND COMPRESSIVE STRESSES.....50-8

Price 35 cents.

G. M. SMITH—Oct. 1953, pp. 137-140 (V. 50)

Experimental data are presented on failure of concrete under combined tensile and compressive stresses. A simple stress-ratio equation, based upon ultimate compressive strength and modulus of rupture, shows a remarkable correlation with experimental data for various combinations of tensile and compressive stresses.

CORRELATION BETWEEN LABORATORY ACCELERATED FREEZING AND THAWING AND WEATHERING AT TREAT ISLAND, MAINE...50-9

Price 75 cents.

THOMAS B. KENNEDY and KATHARINE MATHER—Oct. 1953, pp. 141-172 (V. 50)

Six coarse and eight fine aggregates were used in 48 combinations to make concrete specimens, all with the same water-cement ratio, air content, and slump for comparative testing in accelerated freezing and thawing and exposure to natural weathering at mean-tide elevation at Treat Island, Me.

The two types of exposure, aggregates used, test procedures, and results of dynamic testing of concrete specimens in both exposures are described. A summary is included of the examination of some of the concrete specimens and hypotheses suggested to explain differences in results in the two exposures, and a discussion of the relation of difference between thermal coefficients of coarse aggregate and mortar and durability factor found in these tests. The appendix contains more detailed information on the examination of the concrete and related discussion of other factors believed to be important in explaining results.

Comparison of laboratory and field results indicates that each aggregate combination behaves in an individual manner in each exposure, as influenced by differences in materials and in exposures. Prediction of behavior in one type of exposure from behavior in another cannot be made unless all the differences between the two can fully be evaluated, which is not yet possible.

SHEARING STRENGTH OF REINFORCED CONCRETE COLUMN FOOTINGS.....50-10

Price 50 cents.

EIVIND HOGNESTAD—Nov. 1953, pp. 189-208 (V. 50)

A re-evaluation of F. E. Richart's tests of column footings reported in 1948 shows that the use of present design methods, involving a shearing stress at a distance d

around the column perimeter, does not lead to a consistent factor of safety with respect to shearing failures. A shearing stress at a distance zero around the column was found to be a better measure of shearing strength. The ultimate value of this stress is given as a function of concrete strength and the relative intensity of flexural loading combined with the shearing force. On the basis a new design method is suggested with respect to the shearing strength of column footings.

SELECTION AND DESIGN OF PRESTRESSED CONCRETE BEAM SECTIONS.....50-11

Price 50 cents.

T. Y. LIN and A. C. SCORDELIS—Nov. 1953, pp. 209-224 (V. 50)

The basic concept of the action of an internal bending couple in a prestressed concrete beam as compared to that in a conventional reinforced concrete beam is introduced. Using this concept, criteria for the selection of shapes and formulas for the design of sections are developed. Tables giving design constants are listed for various common beam sections. Relative advantages and disadvantages of different types of cross sections are discussed. Using the method developed, an example beam section is designed.

RELATION OF SHRINKAGE TO MOISTURE CONTENT IN CONCRETE BLOCK.....50-12

Price 50 cents.

GEORGE L. KALOUSEK, RICHARD J. O'HEIR, KENNETH L. ZIEMS, and EDWIN L. SAXER—Nov. 1954, pp. 225-240 (V. 50)

Six types of aggregates and five curing methods used in commercial block production were used for shrinkage studies and strength determinations of concrete masonry units. Shrinkage and moisture loss were determined at 73 ± 3 F in a cycle consisting of exposure to air at 25 percent relative humidity, immersion in water, exposure to air at 70 percent relative humidity, followed by exposure to air at 25 percent relative humidity.

Autoclaved products underwent about half the shrinkage shown by units cured by other methods. Curing with steam at atmospheric pressure up to 170 F or moist air at 73 F tended to give the same results for each aggregate. Sand and gravel units shrank the least; cinders, expanded shale, expanded slag, and sintered shale gave similar results which were somewhat higher than that for sand and gravel. Pumice units showed slightly higher shrinkage than the latter group.

The data show that a 40 percent moisture loss does not generally represent more than about 20 to 50 percent of potential shrinkage occurring at 25 percent relative humidity.

TORSIONAL RIGIDITY OF RECTANGULAR SLABS.....50-13

Price 35 cents.

KURT H. GERSTLE and RAY W. CLOUGH—Nov. 1953, pp. 241-248 (V. 50)

Analysis of many three-dimensional monolithic structures requires information as to the torsional rigidity of the elements of which they are constructed. Because of rigid connections at the ends, warping of the members is restricted and bending stresses are induced with the torsion. For this reason, the elementary theory of torsion cannot be applied.

In this paper the effect of end restraint on the torsional rigidity of rectangular slabs has been analyzed. The magnitude of the stiffening effect is found to vary with the length-width ratio of the slab. For square slabs, end fixity increases the rigidity by 80 percent. Even for slabs with length-width ratios of 6, the rigidity is increased by 8 percent. Experimental data are also presented, showing good agreement with the analytical results.

DETERMINATION OF SETTING AND HARDENING TIME OF HIGH-ALUMINA CEMENTS BY ELECTRICAL RESISTANCE TECHNIQUES.....50-14

Price 35 cents.

J. CALLEJA—Nov. 1953, pp. 249-256 (V. 50)

Using electrical resistance techniques developed by the author for determining the setting time of cement pastes, differences in the behavior of high-alumina and portland cements are established experimentally. These techniques are based on variations in electrical resistance of cement pastes during setting.

Experimental results indicate that this method cannot be applied to high-alumina cements in the same manner as used for portland cements, due to probably a partial overlapping of setting and hardening processes in high-alumina cements.

PIER 57 CONCRETED THROUGH THE WINTER.....50-15

Price 35 cents.

M. D. MORRIS—Dec. 1953, pp. 281-284 (V. 50)

Although much has been written about New York's Pier 57 and the new techniques used in its construction, little has been said about the fact that through the five months from November, 1951, through March, 1952, regardless of near zero temperatures, concrete was placed at 60 F and steam cured with no loss of time or ultimate strength. This brief description of this work is not posed as a standard text on the subject of winter concreting but is submitted as a record of how one job was done successfully.

FACTORS INFLUENCING THE STRENGTH OF CONCRETE AS REVEALED BY A SIX-YEAR RECORD OF CONCRETE CONTROL.50-16

Price 50 cents.

J. J. WADDELL—Dec. 1953, pp. 285-296 (V. 50)

This paper presents a summary of six years of concrete control data for the Friant-Kern canal and distribution systems for the Bureau of Reclamation's Central Valley Project in California. The period covered is from June, 1946, to June, 1952. Several relationships between the different qualities of the concrete have been plotted, disclosing both an over-all trend and a cyclic variation. Partial explanation has been made or the trends and cycles, but some of the causes are obscure and defy identification.

LIMIT ANALYSIS AND DESIGN....50-17

Price 35 cents.

WILLIAM PRAGER—Dec. 1953, pp. 297-304 (V. 50)

Many problems concerning limit analysis and limit design of reinforced concrete beams and frames can be treated geometrically in terms of the safe domain in load space. The procedure is illustrated by a typical example involving a frame.

FLOOR AGGREGATES.....50-18

Price 50 cents.

E. W. SCRIPTURE, JR., S. W. BENEDICT, and D. E. BRYANT—Dec. 1953, pp. 305-316 (V. 50)

An investigation was undertaken to evaluate the influence of different aggregates on the wear resistance of concrete floors. Three types of mixes were used: one with ¾-in. aggregate, representing a monolithic floor; one with ⅜-in. aggregate, representing a two-course floor; and one with a fine aggregate, used as a dust coat. Ten different mineral and ground-iron aggregates were tested. An attempt was made to keep all variables except aggregates constant. These included workability, compressive strength, and method of finishing. Abrasion tests indicated that the relative hardness of mineral aggregates was not directly related to the wear resistance of the floor, or at least had comparatively little influence on this property. Similarly, the method of finishing, within the limits of the types of finishing used in this investigation,

was only significant to a small degree. With a malleable-iron aggregate, however, marked differences in wear resistance from that observed with mineral aggregates were found.

VALIDITY OF CERTAIN ASSUMPTIONS IN THE MECHANICS OF PRESTRESSED CONCRETE.....50-19

Price 50 cents.

GROVER L. ROGERS—Dec. 1953, pp. 317-332 (V. 50)

Validity of certain assumptions of structural mechanics applicable to the analysis of prestressed concrete structures is discussed. Results of field tests conducted in France indicate that the calculated load causing the first tensile crack (based on ordinary elasticity theory) in a prestressed concrete slab may be only one-fifth to one-sixth the actual load. This difference has been accredited to the inapplicability of the assumptions of isotropy, homogeneity, and elasticity as employed in the theory of elasticity to prestressed concrete slabs. As a result of these tests new concepts have been suggested as a possible basis for a more realistic theory.

Analytical and experimental results of a test conducted on a laboratory model of a slab prestressed in two directions show that the assumptions and use of the theory of elasticity are indeed adequate. The load causing the first tensile crack was found to be within a few percent of the load predicted using elastic theory. Such agreement indicates that the discrepancies between theory and practice must be attributed to other causes rather than inherent errors in the theory of elasticity.

EFFECT OF AGE OF CONCRETE ON ITS RESISTANCE TO SCALING CAUSED BY USING CALCIUM CHLORIDE FOR ICE REMOVAL....50-20

Price 50 cents.

W. C. HANSEN—Jan. 1954, pp. 341-352 (V. 50)

Tests were made in the field to determine the effect of age of concrete, at the time of the first application of de-icing salt, on the resistance to frost and salt action. Slab specimens 36 x 36 x 6 in., were provided with dikes which permitted the freezing of approximately ¾ in. of water on their surfaces. Specimens were made with Types I and IA cements and a blend of the two cements, which yielded concretes having air contents of approximately 1.5, 3.0, and 5.0 percent. Ice was removed by applications of flake calcium chloride whenever the ¾ in. of water was frozen solid. A total of 55 cycles of freezing and thawing were obtained in the one winter.

Except for the specimens which were 117 and 91 days, respectively, at the first freeze, those made with concrete containing approximately 1.5 percent air were completely scaled in from 5 to 15 cycles of freezing and thawing. Complete scaling was obtained in less than 55 cycles of freezing and thawing with the concrete containing approximately 3 percent air only on specimens which were 29 days or less old at the time of the first freeze, and with concrete containing approximately 5 percent air only on specimens which were 8 days or less old at the first freeze.

CORRUGATED BOX FORMS FOR CONCRETE RIBBED-SLAB CONSTRUCTION.....50-21

Price 35 cents.

H. C. PFANNKUCHE—Jan. 1954, pp. 353-356 (V. 50)

Describes application of corrugated box form to pan construction and to slab on ground structures. Cost data are included.

STRAP STEEL FOR PRESTRESSED CONCRETE STRUCTURES.....50-22

Price 35 cents.

K. P. MILBRADT—Jan. 1954, pp. 357-364 (V. 50)

A new type of prestressing steel—strap steel—is introduced as offering possible economy for this type of construction. Tempered spring steel, 0.048 x 0.625 in., having an average ultimate strength of 215,000 psi and a yield strength of 185,000 psi was used. Economical prestressing clamps were developed. This type of prestressing was then applied to a test beam.

Specific conclusions from the test were: (1) the strap was easily handled, placed, clamped, and stressed either singly or multiply in one operation; (2) bond was sufficient to transfer the prestressing force; and (3) ultimate load deflection for the test beam was obtained with little elongation of the steel.

STUDIES ON THE CEMENTITIOUS PHASES OF AUTOCLAVED CONCRETE PRODUCTS MADE OF DIFFERENT RAW MATERIALS.....50-23

Price 50 cents.

GEORGE L. KALOUSEK—Jan. 1954, pp. 365-380 (V. 50)

Physical tests on sand and gravel units made with different constant-weight mixtures of lime and cement in fixed proportions to the aggregate indicated that strength was directly proportional to unit weight of the raw block. At any given density, strength was largely independent of the cement to lime ratio. Cement generally increased the densities more than did the lime and, therefore, generally showed better strengths. Drying shrinkage appeared to be independent of the lime-cement proportions in sand and gravel units.

In chemical tests using aggregate fines, compositions of autoclaved lime-cement-silica (quartz) solids ranged in composition from about 0.9 to 1.3 mols of CaO per mol of SiO_2 (C/S ratio) providing that silica was present in a sufficient amount. Solids made from mixtures deficient in silica contained, in addition to the 1.3 C/S hydrate of the 0.9–1.3 C/S series, a poorly crystallized form of alpha-type dicalcium silicates hydrate. Reaction solids made with pumice and shale also approached low-lime compositions of about 1.0 C/S. Structure-wise these products are closely related to 0.9 to 1.3 C/S series made with silica fines, but extended in composition to values as high as about 1.5 C/S. These, and the phases which extended in composition above a 2.0 C/S ratio, did not undergo any apparent recrystallization to the alpha-type hydrate. Differential thermal analysis, in conjunction with chemical analyses, made it possible to differentiate between solids phases of different C/S ratios made of a given aggregate, or products of a given C/S ratio (from about 0.9 to about 1.3) made with different aggregates.

PROPERTIES OF CONCRETE AND THEIR INFLUENCE ON PRESTRESS DESIGN.....50-24

Price 50 cents.

RAYMOND E. DAVIS and G. E. TROXELL—Jan. 1954, pp. 381-392 (V. 50)

Of the various properties of concrete that have to be taken into consideration in prestress design, there are three that merit special attention: (1) the necessity for uniformity of quality of concrete throughout a prestressed member, (2) the desirability of employing a concrete for which the drying shrinkage will be low, and (3) the desirability of employing a concrete for which the creep under the action of prestress will be low. Factors which influence the degree of uniformity and magnitude of drying shrinkage and creep are discussed and suggestions made concerning the use of materials and practices which may be expected to lead to most favorable results.

To secure uniformity, there is required a concrete mix that is more than ordinarily plastic and sticky, and which when vibrated will flow readily into place without segregation and bleeding. Close job control is required with respect to grading of materials, batching, use of admixtures, mixing, transporting, and placing.

Other things being equal, within the ordinary range of richnesses of mix, drying shrinkage of concrete is nearly proportional to the quantity of mixing water employed, creep is proportional to the quantity of hardened cement paste and the water-cement ratio. To keep these effects at a minimum, it is desirable that the paste content be the minimum and the water-cement ratio be the minimum which will produce a fresh concrete of the desired properties and a hardened concrete of the desired strength. Additional factors affecting shrinkage and

creep include cement composition, grading, maximum size, and character of aggregates; admixtures (affecting uniformity as well as shrinkage); size of prestressed members; and others.

A STORY OF PROGRESS—FIFTY YEARS OF THE AMERICAN CONCRETE INSTITUTE.....50-25

Price 60 cents.

WILLIAM A. MAPLES and ROBERT E. WILDE—Feb. 1954, pp. 409-436 (V. 50)

A brief account of 50 years of significant administrative and technical developments of the American Concrete Institute. It summarizes changing emphasis on various aspects of concrete engendered by technical, economic, and political events and trends over the past half century.

FIFTY YEARS OF DEVELOPMENT IN BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.....50-26

Price 60 cents.

FRANK KEREKES and HAROLD B. REID, JR.—Feb. 1954, pp. 441-472 (V. 50)

Traces 50 years of development in building code requirements for reinforced concrete to provide present users of the ACI Building Code with background information on the evolution of many provisions dealing with design of principal structural elements of a reinforced concrete building. Starting with the formation of the first Joint Committee on Reinforced Concrete in 1904, research and design development and philosophy are reviewed—which culminated in the present ACI Building Code.

HISTORY AND DEVELOPMENT OF PRECAST CONCRETE IN THE UNITED STATES.....50-27

Price 50 cents.

J. L. PETERSON—Feb. 1954, pp. 477-496 (V. 50)

Some of the first uses of precast concrete are described. Early designers used precast concrete for reasons of safety, economy, and savings in time of construction. Descriptions of projects built before 1920 which used precast concrete units weighing up to 75 tons are given. Development of the use of precast concrete for bridges, buildings, and marine construction is described. Introduction of modern methods of prestressed concrete and lift-slab concrete construction is discussed. Future development of precast concrete is predicted.

EVOLUTION OF CONCRETE CONSTRUCTION.....50-28

Price 50 cents.

ROGER H. CORBETTA—Feb. 1954, pp. 501-512 (V. 50)

Evolution of the concrete construction industry can be traced by the improvements in materials, construction techniques, and equipment. Rising costs and efficiency have dictated innovations in concrete construction such as prestressed, tilt up, and lift slab. Each of these, or combinations such as precast prestressed units, have figured prominently costwise and resulted in increasing popular acceptance of concrete construction in these highly competitive times. Equipment has been improved along with new developments in materials and construction techniques, and has stimulated contractors to adopt improved methods of concrete construction.

FIFTY YEARS IN THE TECHNICAL DEVELOPMENT OF CONCRETE PIPE.....50-29

Price 50 cents.

HOWARD F. PECKWORTH—Feb. 1954, pp. 513-524 (V. 50)

An outline of the broader technical developments in the concrete pipe industry over the past 50 years, including manufacturing processes such as hand tamping, mechanical tamping, packing with the packerhead, casting with variations of vibration and vacuum processes, centrifugating, pounding or rolling, and variations such as tamping with vibration, or centrifugation with rolling and vibration. These technical improvements have resulted in a product characterized by thin walls, high strength, and long life.

130-FT SPAN HANGAR IN PRECAST CONCRETE.....50-30

Price 35 cents.

OTTO SAFIR—Mar. 1954, pp. 525-532 (V. 50)

Structural requirements, system used, and details for a 130-ft precast clear-span hangar, 160 ft long, are described. An unusual requirement was that the whole of the superstructure could be disassembled and re-erected at a different location. This led to the adoption of a structural system utilizing bents made up of precast members. Important structural details, method of erection, and full scale test loading data an one bent are also considered in addition to cost figures for the structure.

METHOD FOR ESTIMATING WATER CONTENT OF CONCRETE AT THE TIME OF HARDENING....50-31

Price 50 cents.

JAMES S. BLACKMAN—Mar. 1954, pp. 533-544 (V.50)

Method for determining the original water content of concrete, at the time of hardening, is presented along with the influence of time-temperature conditions of dehydration, character of aggregate, and age and exposure of concrete on the method. Conclusions drawn show that: (a) water content at the time of hardening can be determined satisfactorily, after saturation by a 24-hr immersion, by dehydration at 1100 F for 2 hr, (b) composition of aggregate may affect results of volatilization of aggregate constituents occurs, and (c) age and exposure conditions of concrete specimens do not appear to affect test results. Sample computations for age and aggregate series of tests are included in an appendix.

STATIC AND DYNAMIC ELASTIC BEHAVIOR OF REINFORCED CONCRETE BEAMS.....50-32

Price 50 cents.

JOSEPH PENZIEN and ROBERT J. HANSEN—Mar. 1954, pp. 545-568 (V. 50)

Laboratory investigations of static and dynamic elastic behavior of reinforced concrete beams are described. Results indicate that strains of concrete and steel may be predicted with reasonable accuracy for both static and dynamic conditions of loading provided that (a) proper allowance is made for the effects of creep and cracking of the concrete, and (b) that an exact dynamic theory be used with allowance for damping for the dynamic condition of loading.

CONTROL OF SURGING IN CONCRETE PIPE DISTRIBUTION SYSTEMS 50-33

Price 50 cents.

C. S. HALE, R. E. GLOVER, P. W. TERRELL, and W. P. SIMMONS, JR.—Mar. 1954, pp. 573-584 (V. 50)

Surging in concrete pipe systems preventing or delaying delivery of irrigation water necessitated field and laboratory studies to determine the cause and provide a means of control. The studies show how surging can be controlled by the creation of a system out of resonance, thus holding surge amplitudes within tolerable limits.

LIGHTWEIGHT PRESTRESSED CONCRETE.....50-34

Price 50 cents.

FRED E. KOEBEL—Mar. 1954, pp. 585-596 (V. 50)

Preliminary tests were performed on beams cast from lightweight expanded-shale concrete to determine the applicability of this type of aggregate for prestressing. Tests were also made on similar beams with grouted and nongrouted prestressing steel. Results are plotted in graphical form and conclusions drawn from test results are presented.

COMING OF AGE.....50-35

Price 35 cents.

HENRY L. KENNEDY—Apr. 1954, pp. 617-624 (V. 50)

Retiring ACI President Kennedy reviews the year's activities and new fields of endeavor for the Institute are introduced. It is emphasized that through an extension of ACI's services and contributions to the industry, the Institute's future growth and development is assured.

ECONOMIC TRENDS AFFECTING CONCRETE CONSTRUCTION.....50-36

Price 35 cents.

NORMAN P. MASON—Apr. 1954, pp. 625-632 (V. 50)

Five basic factors to be appraised in determining the concrete industry's 1954 activity are reviewed. These include governmental actions, financing, industry public relations, competition, and development and research. Each of these basic factors will affect the working out of the basic economic laws during the coming year. The construction market for 1954 is viewed optimistically.

SELECTION OF CONSTRUCTION MATERIALS.....50-37

Price 35 cents.

J. F. JELLEY—Apr. 1954, pp. 633-636 (V. 50)

Responsibility of the engineer in the selection of the most economical, the most efficient, and the most suitable material of construction is reviewed. Keener competition between various construction materials will provide the concrete industry with the incentive to develop new techniques, as well as to insure the quality of concrete.

CONCRETE IN RECLAMATION CONSTRUCTION.....50-38

Price 35 cents.

W. A. DEXHEIMER—Apr. 1954, pp. 637-644 (V. 50)

As the Bureau of Reclamation's principal construction material, concrete of good quality is of more than academic concern to the USBR. The use of concrete by the Bureau is reviewed. Inspection practices and specifications are covered briefly, and some of the Bureau's work in concrete research is described.

USE OF CONCRETE BY THE CORPS OF ENGINEERS.....50-39

Price 50 cents.

S. D. STURGIS, JR.—Apr. 1954, pp. 645-656 (V. 50)

The Corps of Engineers' construction program is so extensive and varied that a summary of the Corps' use of concrete provides a fair cross section of the position of concrete in the heavy construction industry. The civil and military works program is reviewed. As part of its design and specification work the Corps has done considerable development work on concrete and these studies are enumerated briefly.

BASIC DESIGN CRITERIA FOR CONCRETE GRAVITY AND ARCH DAMS.....50-40

Price 50 cents.

J. J. HAMMOND—Apr. 1954, pp. 657-668 (V. 50)

With the accumulation of considerable data on the behavior of concrete dams by the Bureau of Reclamation, it was thought current design practices might be revised to permit more rational design with attendant economy. Accordingly, a Bureau committee analyzed: (1) forces that act on gravity and arch dams to promote instability or structural failure, (2) resisting forces which promote stability or structural competency, (3) meaning and measurement of factor of safety, and (4) requisite strengths of materials and foundations and methods of measurement.

Analyses disclosed that gravity and arch dam design may be made more rational by the adoption of uniform and consistent procedure, and by full utilization of data from analytical procedures, laboratory investigations, and measurements of the behavior of structures in service. Design criteria, derived from these investigations, for concrete arch and gravity dams are included.

RAPID DESIGN OF CONTINUOUS PRESTRESSED MEMBERS.....50-41

Price 35 cents.

E. I. FIESENHEISER—Apr. 1954, pp. 669-676 (V. 50)

Advantages of prestressing combined with continuity are emphasized and fixed-end moment formulas for various conditions of prestressing may help to make the combination feasible. Line of thrust and kern boundary concepts are advocated for use in design and their use is illustrated in an example of a three-span continuous beam structure.

DESIGN OF CONCRETE MIXES FOR VACUUM PROCESSING.....50-42

Price 50 cents.

JOHN G. DEMPSEY—Apr. 1954, pp. 677-688 (V. 50)

Results of applying the vacuum process to field and laboratory mixes are analyzed with respect to the workability and strength, and an inquiry is made into the apparent relationship between vacuum process slabs and specialized vacuum cylinders made from the same batch. The effect of the vacuum process on the water-cement ratio is discussed and a method of designing concrete mixes so as to protect the final yield of the concrete and secure full benefits of the system is proposed.

COMBINED FORM AND REINFORCEMENT FOR CONCRETE SLABS.....50-43

Price 50 cents.

BENGT F. FRIBERG—May 1954, pp. 697-716 (V. 50)

One-way concrete slab construction, designated as "re-form," is described, in which high-strength galvanized corrugated steel is both form and reinforcement for the concrete, and in which temperature reinforcement, welded to the corrugated steel, performs shear transfer. Structural tests are described and analyzed. Suggestions are given for moment distribution in slabs cracked over the supports in continuous spans. Long-time deflections of thin slabs are appraised. Design procedures and applications for re-form construction are indicated.

NATURE OF BOND IN PRE-TENSIONED PRESTRESSED CONCRETE.....50-44

Price 50 cents.

JACK R. JANNEY—May 1954, pp. 717-736 (V. 50)

Methods and findings of an investigation of bond in pre-tensioned prestressed concrete members are discussed. Two types of tests were involved. Bond near the ends of a prestressed member after release of the wire pre-tension was studied using prismatic specimens. Beam specimens were used to study flexural bond and the inter-relation between this flexural bond and the bond resulting from the transfer of prestress. Principal variables considered were diameter, surface condition, and the degree of pre-tension of the wire reinforcement.

A variation in anchorage length and general shape of the stress transfer distribution was noted for wires of different diameters and for different surface conditions ranging from rusted to lubricated. Similar observations were observed when the pre-tensioned steel was released to concretes of different strengths. An elastic analysis of the deformations occurring when pre-tensioned steel is released confirms the test results in suggesting that the prestress transfer bond is largely a result of friction between concrete and steel.

Beam tests indicate that reliable values for flexural bond stress after cracking are not obtained by the expression generally accepted for calculation of bond stress. High bond stresses develop only after cracking has occurred. Consequently, if loss of bond is the cause of beam failure, a prestressed beam will carry a greater ultimate load than an unprestressed beam reinforced with the same steel.

PRACTICAL ASPECTS OF PLANT PRODUCED PRESTRESSED CONCRETE.....50-45

Price 35 cents.

ORLEY O. PHILLIPS—May 1954, pp. 737-740 (V. 50)

Development of plant for mass production of pre-tensioned concrete units is described. Versatility and speed of production are essential. Importance of close coordination of engineering planning, design, and details of prestressed members with the manufacture, handling, and erection is emphasized. Costs of prestress construction are included.

VOID SPACING AS A BASIS FOR PRODUCING AIR-ENTRAINED CONCRETE.....50-46

Price 50 cents.

T. C. POWERS—May 1954, pp. 741-760 (V. 50)

Basic studies show that the function of entrained air is to protect the paste and that the effectiveness depends on the distance from void to void in the paste. Freezing and thawing tests show different mixes have nearly equal frost resistance when the spacing factor is about 0.01 in. The amount of air required for a given spacing factor is directly proportional to the paste content and is greater the smaller the specific surface of the air voids.

The void system is made up of relatively coarse natural voids and entrained bubbles. Characteristics of natural voids vary with aggregate grading, consistency, and other mix characteristics. With a given amount of air-entraining agent in the mixing water, the amount of entrained bubbles is smaller the greater the quantity of cement or other fine solids in the water.

A procedure is suggested for designing a fixed spacing factor where such procedure is economically feasible.

CRUSHED STONE PRODUCTION....50-47

Price 50 cents.

A. T. GOLDBECK—May 1954, pp. 761-772 (V. 50)

Prospecting for and production of commercial crushed stone are detailed with emphasis on modern trends in the crushed stone industry. Quarrying, transportation of quarried stone, crushing, screening, washing, production of stone sand, and related operations are described as to equipment, methods, and trends. A selected bibliography of 71 references completes the report.

CELLULAR CONCRETES

PART 1.....50-48a

RUDOLPH C. VALORE, JR.—May 1954, pp. 773-796 V. 50)

PART 2.....50-48b

RUDOLPH C. VALORE, JR.—June 1954, pp. 817-836 (V. 50)

Price $1.00 (Parts 1 and 2 in covers)

A review is given of methods of preparation and physical properties of moist- and high-pressure steam-cured cellular concretes, ranging in density from 10 to 100 lb per cu ft, as they have evolved in Europe in the past 30 years. Data are given for Swedish, Danish, Russian, German, British, and Belgian materials, and for experimental mixtures prepared at the National Bureau of Standards. The most economical and controllable cell-forming process, which is preformed foaming, employs hydrolyzed protein foaming agents. Aluminum powder and hydrogen peroxide gas-forming processes and the excess water process are also described.

Moist-cured materials contain portland cement, neat or with sand; they are used as insulation, roof or floor fills, and for fire protection. Cellular neat cement has adequate strength for structural use at densities above 40 lb per cu ft but the linear drying shrinkage ranges from 0.3 to 0.6 percent. Cement-sand mixtures have lower strength, higher shrinkage, and higher absorption than lightweight aggregate concretes of comparable density.

Autoclaved materials contain portland cement or lime and finely divided siliceous materials such as ground sand, fly ash, and burned oil shale. Ratios of binder to "pozzolan" range from 1:0.5 to 1:4 for cement and 1:1 to 1:6 for lime, depending on fineness and composition of the binder and siliceous material.

Compressive strengths were 250 to 1000 psi at 30 lb per cu ft, 400 to 2000 psi at 40 lb per cu ft, and 800 to 3000 psi at 50 lb per cu ft. Flexural strengths were 1/5 to 1/3 of the compressive strength. Drying shrinkages ranged from 0.01 to 0.10 percent. Water absorptions were 20 to 50 percent by volume. Elasticity, thermal expansion, fire resistance, and acoustic properties are also discussed.

Thermal conductivity data from various sources are in good agreement and are a function of density from 10 to 70 lb per cu ft, regardless of composition, cell-forming process, or curing.

FLEXURAL STRENGTH OF PRESTRESSED CONCRETE BEAMS...50-49

Price 50 cents.

D. F. BILLET and J. H. APPLETON—June 1954, pp. 837-856 (V. 50)

Analytical and experimental studies on behavior and ultimate flexural strength of post-tensioned, end-anchored, bonded, prestressed concrete beams are reported. A rational analysis is developed for computing ultimate moment and steel stress at failure. Approximate expressions are given for computing ultimate steel stress for cases when the stress-strain curve for the steel reinforcement may be approximated by two straight lines.

Results of tests on 26 rectangular prestressed concrete beams are presented. The effect of major variables—percentage of steel, amount of prestress, and concrete strength—on deflections, cracking loads, and ultimate loads are studied.

Twenty-one beams failed in flexure, either by crushing of concrete after excessive elongation of reinforcement or by crushing of concrete while steel stress was in the elastic range. Three beams were nearly balanced between shear and flexural failure, and two beams failed initially in bond. Comparisons of actual ultimate moments with those computed by analytical expressions show good agreement.

PERLITE INSULATING CONCRETE..50-50

Price 50 cents.

J. JOHN BROUK—June 1954, pp. 857-868 (V. 50)

Production, properties, and applications of perlite insulating concrete are described including mining and manufacture of perlite aggregate, variation in different perlite deposits, basic cost data, physical properties of perlite concrete, and significance of aggregate hardness. The basic "1:6 mix" for perlite insulating concrete, and job recommendations for this mix, covering roof decks and roof fills are detailed. Examples of use of perlite in insulating roof decks and roof fills and other applications are included.

MINIMUM BAR SPACING AS A FUNCTION OF BOND AND SHEAR STRENGTH.....50-51

Price 50 cents.

PHIL M. FERGUSON, ROBERT D. TURPIN, and J. NEILS THOMPSON—June 1954, pp. 869-888 (V. 50)

Results of investigations to establish minimum allowable bar spacings in reinforced concrete members are reported. This required considerable study on what bond strengths could be developed without any special provisions against splitting from the action of radial forces induced in the concrete by the inclined compressive forces set up by bearing of the lugs of deformed bars. An eccentric pull-out test was used to measure bond strength in specimens. Results indicate conservatism in the ACI Building Code on the matter of minimum bar spacing under some conditions, accompanied by inadequate protection against failure in bond under other circumstances.

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there will be no Journal issues in July and August

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Concrete for Radiation Shielding—Edwin J. Callan

Absorption by Concrete of X-Rays and Gamma Rays—B. E. Foster

Effect of Sustained Overload on the Strength and Plastic Flow of Reinforced Concrete Beams—G. W. Washa and P. G. Fluck

Economical Design of Prestressed Concrete Beams—David P. Billington

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Failure of Concrete under Combined Tensile and Compressive Stresses—Gerald M. Smith

Correlation Between Laboratory Accelerated Freezing and Thawing and Weathering at Treat Island, Maine—Thomas B. Kennedy and Katharine Mather

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Selection and Design of Prestressed Concrete Beam Sections—T. Y. Lin and A. C. Scordelis

Relation of Shrinkage to Moisture Content in Concrete Block—George L. Kalousek, Richard J. O'Heir, Kenneth L. Zeims, and Edwin L. Saxer

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